



**MINISTRY OF JUSTICE OF THE REPUBLIC OF LITHUANIA
TRANSPORT ACCIDENT AND INCIDENT INVESTIGATION DIVISION**

**Very serious accident to Lithuanian flag
Ro-Ro cargo ship Botnia Seaways, IMO 9192129,
that occurred on 23 November 2017,
in Rades, Tunisia**

FINAL REPORT



30 October 2018
No. (L-17/08)1A-167

FOREWORD

The safety investigation is conducted in accordance with Casualty Investigation Code, adopted by IMO resolution MSC.255(84), Commission Regulation (EU) No 1286/2011 of 9 December 2011 adopting a common methodology for investigating marine casualties and incidents developed pursuant to Article 5(4) of Directive 2009/18/EC of the European Parliament and of the Council, Article 48 of Maritime Safety Law of the Republic of Lithuania and Description of the procedures for preparation and submission of marine casualty and incident investigations, reports and safety recommendations, approved by the Order No 1R-386 of the Minister of Justice of the Republic of Lithuania on 30 December, 2016.

The purpose of the safety investigation is to prevent the occurrence of accidents and incidents in the future, rather than establish blame or liability. The safety investigation is conducted independently of any judicial or administrative proceedings, has no aim to apportion blame or liability, is not related to them, and have no impact thereupon.

Each safety investigation shall be concluded with a report in a form appropriate to the type and seriousness of the casualty or incident. The report shall contain, where appropriate, safety recommendations, which shall in no case create a presumption of blame or liability for casualty or incident.

The safety investigation report shall not be used as evidence in a judicial or administrative process seeking to apportion blame or liability, because this was not established in the course of the

safety investigation and it is not compatible with the objective of the safety investigation.

The information is published to inform the maritime industry and the public of the general circumstances of the casualty or incident. Extracts may be published without specific permission providing that the source is duly acknowledged, the material is reproduced accurately and it is not used in a derogatory manner or in a misleading context.

This is a courtesy translation by the Transport Accident and Incident Investigation Division of the Final Report on the Safety Investigation. As accurate as the translation may be, the original text in Lithuanian is the authentic version and the work of reference.

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SUMMARY

Owner and operator of seagoing ship	DFDS Seaways JSC
Ship building yard	„Jinling Shipyard“, People's Republic of China
Ship's name	Botnia Seaways
Type of ship	Ro-Ro cargo
Ship's flag	Republic of Lithuania
IMO number	9192129
Place of the accident	Rades port area Republic of Tunisia 36° 46' 00" North 010° 17' 00" East
Date and time of the casualty	23 November 2017 8:03 (9:03 UTC) ¹

Synopsis

On 23 November 2017, 8:03 at Rades port area, Republic of Tunisia, while discharging container from the weather deck of berthed ship Botnia Seaways, registered in the Register of Seagoing Ships¹ of the Republic of Lithuania, by shore crane, the crewman – ordinary seaman of Botnia Seaways was pressed between the trailers, situated on the same weather deck. The seaman was seriously injured and soon died in hospital. No damage to ship and environment was sustained.

¹ Ship's time is used in the report.

Safety investigation

Botnia Seaways operator - DFDS Seaways JSC notified Lithuanian Maritime Safety Administration about the casualty on 11:27 of the same day. Lithuanian Maritime Safety Administration on 13:40 forwarded notification about the casualty to safety investigation authority.

Pursuant to paragraph 5.1 of the Description of the procedure for the classification of marine casualties and incidents and notification of marine casualties and incidents, approved by Order No 3-461 of the Minister of Transport and Communications of the Republic of Lithuania, Botnia Seaways fatality is classified as very serious accident.

There was no marine accident investigator employed at the moment of casualty. Taking into account the fact, that Investigator-in-Charge was employed on 15 March 2018, the safety investigation into Botnia Seaways casualty was started on 26 March 2018.

As provided in Chapter 10 of Casualty investigation Code, adopted by IMO resolution MSC.255(84), all substantially interested States shall co-operate with the marine safety investigating State(s) to the extent practicable. Taking this provision into account, on 26 March 2018, safety investigation authority addressed Tunisian Safety investigation authority (*Office de la Marine Marchande et des Ports*) by seeking mutual co-operation and requesting to provide information necessary to conduct safety investigation. Safety investigation authority also addressed other Tunisian authorities – Ministry of Transport (*Ministère du Transport*), stevedoring company which conducted a discharge operations during the casualty (*Societe Tunisienne D'acconage et de Manutention*), agency company SOCOTU. None of the above entity have provided the requested information nor expressed willingness to co-operate in conducting safety investigation. In addition to that, safety investigation authority addressed Lithuanian Honorary Consul in Tunisia by asking him for a help for safety investigation from Tunisian authorities. The Consul replied to the request, however informed that he has no competence to provide help to get the information for investigation from Tunisian authorities.

Therefore it was no possibility to identify nor to interview any person from Rades port, who was involved in the casualty.

1

FACTUAL INFORMATION

1.1. Narrative

Botnia Seaways was on scheduled route Marseilles – Rades. On 21 November 2017 she departed from the port of Marseilles and in the morning of 23 November arrived at the port of Rades.

6:15 Pilot on board. Preparation for mooring started.

6:45 First mooring rope ashore. Mooring started.

6:55 Ship alongside quay No 3. Pilot left the ship. Agents informed master that discharge of containers is planned to conduct by shore crane.

7:30 Shore stevedores on board.

7:50 Discharge from weather deck started. Three trailers, stored close to containers, discharged. Shore mobile crane, specially designed for container loading/unloading, situated ashore on the quay. Preparing for container discharge operation.

8:01 Shore crane operator attempts to secure spreader (special device used for lift, load and unload of containers) which is connected with crane derrick by ropes, with the container.

8:02 Signaller gives signal to crane operator to unload the container without urging crewmembers to leave the dangerous zone. Crane operator tries to lift the container and after several attempts the container lifts up and suddenly moves horizontally to the side and hits the front part of the closely situated trailer. Due to impact the trailer moves from its position and hits another

trailer, located in parallel. At this moment Botnia Seaways seaman (OS) was situated in between these two trailers and he was pressed by them.

8:03 Unloading of the container finished by shore crane. Unloading operations stopped. OS from Botnia Seaways, who was monitoring unloading operations, via VHF station informed Botnia Seaways crew about the OS pressed in weather deck.

8:05 Botnia Seaways 3rd mate arranges an ambulance call, captain informs the ship's agent (SOCOTU) about the accident. The injured OS is given first aid by placing the neck support, moving it to the stretcher and immobilizing it.

1.2. Shore authority involvement and emergency response

An ambulance, called by the Botnia Seaways crew, arrived in about 10 minutes after the accident. Three minutes later, a second ambulance crew arrived. Five to six minutes after the arrival of the first ambulance crew, the injured OS was taken to the hospital. Approximately an hour after the accident, the injured OS died.

Discharge operations after the accident were terminated and resumed only after a while. When resumed, the containers were unloaded properly and safely. It was not possible to determine whether the remaining containers were unloaded by the same shore crane operator, or he was changed after the accident.

1.3. Ship particulars

Botnia Seaways (Fig. 1) particulars are provided in Table 1.



Fig 1. Botnia Seaways (Picture by DFDS Seaways JSC)

Table 1. Botnia Seaways particulars

Flag, registration	Lithuanian flag. Registered in the Register of Seagoing Ships' of the Republic of Lithuania.
Ownership and management	DFDS Seaways JSC
Identification	International Maritime Organisation (IMO) number: 9192129 Call sign LYT Maritime Mobile Service Identity (MMSI) number: 277399000
Main characteristics	Gross tonnage: 1 1530 Length: 162,58 m Breadth: 20,62 m Class: Lloyds Register Superstructure arrangement: front (Fig. 1) Ro-Ro cargo is loaded via ramp arranged in the aft. There are 3 cargo decks arranged: weather, main and below – hold of the main deck.
Year of build	2000 m.
Minimum safe manning	13
Cargo allowed	Ro-Ro cargo (trailers, lorries, cars and similar), containers.

1.4. Cargo information

Ship was loaded by Ro-Ro cargo and eight containers (20 ft). Some of the loaded containers contained dangerous cargo. All containers were located on weather deck on lane No 6 in double stacks (Fig. 6).

Trailers and containers – ordinary cargo for Botnia Seaways when on the route Marseilles–Rades, however containers were loaded not for every voyage. Often Botnia Seaways was loaded by trailers only. The container discharge of which resulted in fatality was the first container from Botnia Seaways discharged on that day. As provided by DFDS Seaways JSC this container contained appropriate class dangerous military cargo.

1.5. Data about the crew

Botnia Seaways crew was formed by DFDS Seaways JSC when it purchased the ship in 2009. On the day of the accident, the crew consisted of 19 seafarers who were citizens of the Republic of Lithuania. The crewmembers, including the deceased seaman, knew their colleagues well. In the line Marseilles - Rades Botnia Seaways has been operating since February 2017. The Botnia Seaways crew is replaced every 4-6 weeks (except for cadets who collect a seagoing service, their work on board can last 4 months) - thus allowing the crew to feel comfortable and avoid fatigue. This voyage was routine, no different from the others.

1.5.1. Data about deceased OS

Deceased OS - the ordinary seaman - was 63 years old. He started his carrier in shipping company from 1984 (before that he served as a motorman on board). On Botnia Seaways, he was working since 2009. He had valid qualification documents, issued by Lithuanian maritime safety administration – OS certificate of competency issued on 17 April 2014, Personal survival techniques, fire prevention and firefighting, elementary first aid, personal safety and social responsibilities special certificate issued on 28 June 2016, Proficiency in survival craft and rescue boats other than fast rescue boats training program special certificate issued on 17 June 2015. He also had valid medical fitness certificate, issued on 23 February 2017 by medical fitness commission of Klaipeda Seafarers Hospital's Maritime Medical Department and until 23 February 2018. On 12 April 2017 he was instructed in the workplace on safety and health requirements. On 7 June 2017 he was familiarised with job description, technical instructions and risk assessment procedure No 7.1.5. Two days before the accident he returned to Botnia Seaways from leave. On 20 November he worked on board 8 hours, on 21 and 22 November – 10 hours each day and 23 November – 2 hours. During the accident he was wearing all necessary personal protective equipment.

1.5.2. Data about Seaman-cadet

Seaman-cadet – 22-year-old marine navigation 4 year student at Lithuanian Maritime Academy. He was serving on board Botnia Seaways from 11 September 2017. It was the second ship where he was serving. On the day of the accident, he had valid Personal survival techniques, fire prevention and firefighting,

elementary first aid, personal safety and social responsibilities special certificate issued by Lithuanian maritime safety administration on 2 September 2015.

1.5.3. Data about OS

Ordinary seaman (OS) – 45-year-old, together with deceased OS and seaman-cadet observed cargo unloading from Botnia Seaways. On the day of the fatality he had valid qualification documents, issued by Lithuanian maritime safety administration: able seaman (AB) certificate of competency issued on 20 February 2014, Personal survival techniques, fire prevention and firefighting, elementary first aid, personal safety and social responsibilities special certificate issued on 21 January 2016, Proficiency in survival craft and rescue boats other than fast rescue boats training program special certificate issued on 15 June 2015.

1.5.4. Data about chief mate

Chief mate - 42 year old. Experience on Ro-Ro cargo ships – 5 years, on seagoing ships of other type - 9 years. Participated in providing first aid to the deceased OS, accompanied him to the hospital.

1.6. Shore workers, persons who performed cargo-unloading operations

No information have been received about the skills, health status, fatigue, competence, knowledge of the safety requirements of shore workers who performed cargo-unloading operations from Botnia Seaways. Identity of these people is unknown. According to information provided by the DFDS Seaways JSC, Botnia Seaways crew had heard about irresponsibly working Rades port stevedores. It was also known that earlier a fatal accident occurred in the other vessel during cargo handling operations at Rades port - when Rades port stevedore was hit by shore vehicle with trailer. However no official information have been received about this occurrence.

1.6.1. Data about crane operator

Crane operator was shore worker. He was in charge to unload container when accident occurred. His identity is unknown.

1.6.2. Data about signalman

Signalman was shore worker. He maintained contact with crane operator when the accident occurred. His identity is unknown.

1.7. Information about human factor

The investigation has not received any information indicating that fatigue, health issues, alcohol or drugs contributed to the accident.

The working hours of the deceased OS during the 3 days prior to the accident indicates that he had the opportunity to get sufficient rest and sleep.

1.8. Meteorological information

At the moment of fatal accident, Botnia Seaways had no list, the wind was steady in the southern direction, its speed was constant and reached 2-3 m/s.

1.9. Discharge of containers from ship

According to settled practice, in case trailers and containers are loaded on Botnia Seaways deck, at first trailers were discharged, and only then - containers. In this way, the crewmembers responsible for unloading the cargo had enough space to monitor the discharge of containers from the weather deck. However on 23 November 2017, only 3 trailers were discharged at first and immediately after that unloading operations of the container had been started.

1.9.1. Discharge of container

Shore crane operator tried to fix (secure) spreader on top of the container and did it after a few attempts. Before lifting the container, the behaviour of shore workers (stevedores) was nervous, they shouted to the crew to urgently check whether the twistlocks are released or not, i.e. repeated an English phrase - "open twistlocks". Seafarers from Botnia Seaways who monitored unloading operations reacted to that instigation – OS and seaman-cadet checked twistlocks of one side of the container and deceased OS – of the other side.

Botnia Seaways crewmembers witnessed that shore crane operator could not see OS and seaman-cadet from his position. Though they were in the signalman viewing area, the signalman,

while giving sign for crane operator to lift the container, did not give any warning signs to the persons situated on the Botnia Seaways weather deck.

The image captured by the ship's video recorder on the stern shows the horizontal movement of lifted container (Fig. 2, 3).



Fig. 2. Lifting container



Fig. 3. Position of the container after 5 seconds from the lifting moment

The image captured by the ship's video recorder on the stern shows the position of container K and trailers T1, T2 and T3 before the lifting the container K (Fig. 4a). The impact of the container K on the front of the trailer T1 is shown in Fig. 4b. Due to the impact, this trailer has moved towards the other closely situated trailer T2 (Figures 4b and 4c). The deceased OS was situated in between of trailers T1 and T2, he was pressed in between of them (Fig. 4c). The lifted container then stuck the trailer T3 by the other edge (Fig. 4d). Mobile shore crane, which was used to unload the container is shown in Fig. 5.



Fig. 4. Lifting the container



Fig. 5. Mobile shore crane

Fig. 6 contains Botnia Seaways weather deck's stowage plan, composed by DFDS Seaways JSC. OS and seaman-cadet shown by blue circles, deceased OS – by green circle. Stevedores (shore staff) are not indicated in Fig. 6. In the top part of the figure, red arrows indicate three trailers, which were unloaded at first. In the middle part of the figure the movement of Botnia Seaways crewmembers before the moment of fatal accident is shown. The scene of the accident is shown in the bottom part of the figure: the red arrow shows the movement direction of lifted container, two positions of lifted container at the moments of impacts are also shown.

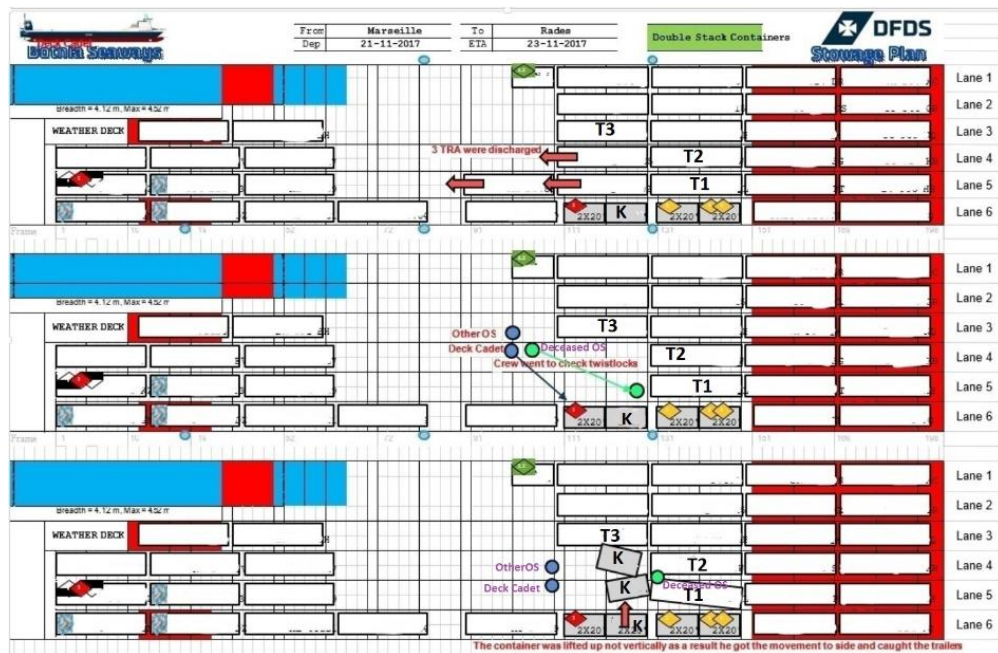


Fig 6. Stowage plan and discharge of container (picture composed by DFDS Seaways JSC)

There is no evidence that the crane was inoperative or limited in operation.

1.9.2. Procedure for cargo operations

According to data provided by DFDS Seaways JSC, shore staff had a responsibility to carry out the cargo discharge operations from Botnia Seaways in port of Rades. The role of the ship's crew here was only to monitor the cargo discharge without participation in unloading operations. The aim of such monitoring – in case of cargo damage, to detect and register the event.

Occupational safety requirements, applicable for Botnia Seaways accident, are described in Occupational Safety and Health Instruction No 8L, applicable for crewmembers, occupation code 8340, who are in charge of cargo loading/unloading, cargo securing and connection/disconnection of a temperature-cargo unit to/from ship electrical networks in ro-ro ships, approved by director general of DFDS LISCO on 2 January 2008 by the order No 01-1-2 (hereinafter referred as - Occupational Safety and Health Instruction No 8L). It provides:

4.9. Persons not involved in cargo operations, are not allowed to walk on cargo decks, except cases of embarkation or disembarkation. In such cases cargo operations shall be terminated.

Internal document Cargo Operations Procedure No. 7.4.0, adopted by DFDS Seaways JSC on 1 February 2017, regulates safety of cargo operations on board. It states:

The procedure establishes an order for employee actions on board ships, assesses the risks that may arise during cargo handling operations and ensures the safety of crew members, passengers, cargo and vessel and the protection of the marine environment.

<...>

A ramp seaman is monitoring cargo handling operations, and notifies the cargo officer whether he notices the deviation from the rules.

The hand signals used during cargo handling operations shall not be ambiguous, it is mandatory to use standard international signals to avoid misunderstandings. In order to alert drivers or other persons involved in cargo operations, it is mandatory to use a whistle.

1.9.3. Cargo operations in Rades port

According to DFDS Seaways JSC, the cargo discharge operations at Rades port was carried out by a stevedoring company operating in Tunisia (Societe Tunisienne D'acconage et de Manutention). Cargo discharge operations were organized and carried out by port Dockers, crane operators, stevedores, signalizers, truck drivers. During the investigation it was not possible to determine who were they and how much of them participated in the container discharge operation, how their duties and responsibilities were allocated. It was also not possible to determine whether they used some occupational safety rules and if used what such rules have been.

The Code of Practice on Safety and Health in Ports, adopted by International Labour Organisation, is not a legally binding instrument, contains a set of recommendations, based on best practices. The Code provides:

5.2.1.12. Lifting appliance operators should:

- only perform lifting operations when specifically instructed to do so by the designated signaller; however, every emergency stop signal should be obeyed;*
- perform the operations smoothly, avoiding sudden jerks.*

<...>

6.3.3.3. Loaded containers should generally be lifted by container cranes vertically from their four top corner fittings with the aid of a purpose-designed spreader.

1.10. Safety management system

1.10.1. Safety management system and risk assessment

The International Management Code for the Safe Operation of Ships and for Pollution Prevention, adopted by International Maritime Organization by Resolution A.741 (18), (hereinafter – ISM Code) provides:

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:

1.2.2.1. provide for safe practices in ship operation and a safe working environment;

1.2.2.2. assess all identified risks to its ships, personnel and the environment and establish appropriate safeguards; and

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

DFDS Seaways JSC has implemented a safety management system in accordance with the requirements of the ISM Code.

On 1 October 2016, DFDS Seaways JSC adopted Safety and Environmental Protection Policy No. 2.1.0, which aims to implement the requirements of ISM Code. The document states:

Every employee whether on board ship or ashore, adheres to strict maritime safety and environment protection requirements, and is responsible to do his best to prevent injuries and loss of human life. This is achieved by adhering to the ideas of the International Safety Management Code, implemented in the company.

On 1 October 2016, DFDS Seaways JSC adopted Procedure for Risk Assessment on Board No 7.1.5, the purpose of which – to determine the order for ship and crew safety risk assessment and

the proper documentation of this process. The document provides:

Before carrying out any operations on board, all risk factors related to the safety of the ship or its crew, environmental protection and the nature of the work performed must be assessed.

<...>

It is mandatory to assess the risk every time a work environment is changing and new, previously unassessed hazards or risks may appear, and especially when staff is lacking in experience and qualifications.

<...>

A basic set of risk assessment has been developed for the main company's vessels operations, which is to be kept on every ship of the company.

If it is required to carry out a specific operation on board which is not mentioned in basic set of risk assessment or in the event of new risks, the Master shall carry out an operational risk assessment.

In Botnia Seaways was used a basic set of risk assessment, approved on 1 July 2010. It does not contain risk assessment cases of cargo loading and (or) unloading, lashing and (or) unlashings operations, when they are performed only by shore stevedoring company without crew involvement.

There is no data about operational risk assessment performed on board Botnia Seaways.

1.10.2. Internal and external audits of the safety management system

According to the provisions of the ISM Code, internal audits and external audits (intermediate inspections) of the safety management system shall be performed on board periodically. The audit examines whether the on-board safety management system complies with the requirements of the ISM Code. If deficiencies are identified, the ship's crew must rectify them within the set deadline.

In Botnia Seaways, the internal audit team of DFDS Seaways JSC conducted an internal audit of the safety management system in 11-12 April 2017. The ship at that time was already operated on the Marseilles-Rades line. No deficiencies or comments related to risk assessment as provided in the ISM Code were reported in the audit report.

On 18-19 December 2016, Lithuanian Maritime Safety Administration audited safety management system in Botnia Seaways. The audit (intermediate inspection) was performed in accordance with the assessment Plan, composed taking into account the provisions of the ISM Code. The Plan had not foreseen that any areas related to risk assessment should be checked during the planned intermediate inspection. In the interim report produced by Lithuanian Maritime Safety Administration, there were also no discrepancies or comments related to the Botnia Seaways risk assessment.

In the Lithuanian Maritime Safety Administration's Inspection report's template (standard format), the following provision is provided:

The assessment was carried out in accordance with the requirements of the ISM Code and in accordance with ISO Standard 10011. In the safety management system, unobserved deficiencies may remain, as the principle of evaluation is checking the selected objects - the sections.

1.11. Safety actions after the accident

1. On 23 November 2017, 14:25, on the same day when fatal accident occurred, the DFDS Seaways JSC distributed an order to its entire fleet to take action to prevent such accidents in the future. In the e-mail to the ship's crew, it is indicated:

1. Before starting cargo handling operations, an extraordinary briefing for involved crew members shall be executed. Occupational Safety and Health Instruction No 8L and Safety Management Control System Procedure No. 7.4.0 must be carefully analysed and discussed. Particular attention should be paid to the following:

- constant visual contact with colleague and drivers till the cargo unit will be in position and engine switched off.*
- stop cargo unit immediately when mentioned contact is lost.*
- Lashing/unlashing shall be started only when cargo units are located in designated place, engine is switched off or trailer without a driver is detached from the truck.*
- Crew members have to keep clear as practically as possible from the moving cargo units and equipment.*
- Always use all PPE (helmet, safety shoes, high visible jackets or working clothes) and whistle. Take into account that only correctly wearied and used PPE protects you.*

2. Revise risk assessment of cargo operations, by paying particular attention for preparation of handling of unordinary cargo.

2. On 16 December 2017 DFDS Seaways JSC conducted an extraordinary review of the risk assessment of cargo operations. This review has replaced the standard risk assessment package adopted on 1 July 2010. The updated risk assessment took into consideration additional risk factors that were not present in the risk assessment package that was in use. The newly performed risk assessment covered risks associated with cargo loading and unloading, lashing and unlashings, when such operations are performed by shore stevedoring company, the new risk management measures were foreseen.

3. DFDS Seaways JSC has conducted an internal investigation, prepared the draft investigation report in which produced recommendations for entire fleet. DFDS Seaways JSC pointed out that the responsible shore staff constantly discusses these recommendations with the chief mates and masters. Such discussions are held before the change of crew.

4. In order to prevent similar accidents in the future, at the initiative of DFDS Seaways JSC, representatives of the stevedoring and lashing companies at Rades Port have been invited several times to a meeting on safety issues. However, it was not possible to arrange this meeting as representatives of Rades port companies showed no willingness to take part in it. However, the letter with the proposals on safety actions that are necessary to take to prevent future accidents being handed over to non-attending representatives, and confirmation was received that it safely reached the recipients. In the Botnia Seaways master's letter to the representatives of the stevedoring and lashing companies at Rades Port it was asked to take necessary actions for accidents/incidents prevention on board the ship in the future:

- 1) Person responsible for safety on deck to be assigned;*
- 2) Signalman responsible for loading/discharging of containers or assistance on trailer manoeuvring must ensure that no persons in dangerous lifting or manoeuvring zone persist;*
- 3) Signalman and lashing gang persons to be clearly identified (wear special clothes like signal vests);*
- 4) During handling of containers by crane, crane operator must always have "eye" contact with stevedore/signalman on deck;*

- 5) No cargo lifting handling operations to be carried if people are present in dangerous zone;
- 6) If it is necessary to relocate the cargo on berth near the vessel by assistance of the crane (for making free passage for crane) ship and ship's agents to be informed in advance, in case when the cargo will be handled above/over the ship's deck;
- 7) Stop all cargo operations (lashing/unlashing, loading/discharging) when crane is operating with hanged cargo above the ship's deck;
- 8) Drivers from stevedoring company must stop the truck/trailer immediately if signal (whistle) was given by crew or other signalman.
- 9) It is prohibited to be on cargo decks for all persons not belonging to lashing or stevedoring gangs, which are working on ship.

2

ANALYSIS

This part of the report do not include analysis of actions of shore personnel, analysis of procedures related to safe loading and unloading of cargo in Rades port, analysis of shore management activities, as related authorities and companies in Rades port showed no willingness to co-operate in this safety investigation and factual information for such analysis was not available.

2.1. Discharge of container

There was no way to determine the reason why the normal cargo unloading sequence from Botnia Seaways weather deck was not followed. The reason of that could be a rush to unload containers with a military cargo as soon as possible. The decision of shore stevedores to discharge only three trailers at first, led to the situation, that available area where crewmembers observing unloading operations were situated, was very limited (Fig. 6).

2.1.1. Actions taken by Botnia Seaways crewmembers

Crew of Botnia Seaways – OS, deceased OS and seaman cadet were responsible only for monitoring of cargo unloading operations. Participation in cargo unlashing was not their responsibility, but when urged by shore personnel they obeyed to this order and checked whether twist-locks are opened.

During the discharge of container, the deceased seaman was situated in hazardous area (Fig. 6, bottom part of the scheme). There was no way to determine whether he monitored the cargo unloading operations, or did or planned to do something else.

According to the video, attempts of shore crane operator to lift the container lasted for about 15 seconds. There was no way to determine whether deceased OS realised the hazard or not, but he did not use this time to step down to a safer place. When container was unsafely lifted, OS and seaman-cadet realised the danger – they ran in different directions.

2.1.2. Actions taken by crane operator and signalman

After Botnia Seaways crewmembers checked the twistlocks, signalman gave a signal to the crane operator to lift-up the container. However he did not warn about that the crewmembers who were on the Botnia Seaways weather deck.

The position of ropes between the crane derrick and the spreader to which was attached the container - was not vertical and not perpendicular to the deck (Figures 3 and 4a). Discharge of container when lifting direction is not vertical is hazardous – it poses risk to damage container, cargo nearby, equipment on board, people. After lifting-up attempts, the container eventually was lifted and immediately moved horizontally (Figures 3 and 4).

While unloading the container, crane operator was not able to see OS and seaman-cadet. Most probably he was not able to see the deceased OS, therefore the role of signalman was critical when warning persons situated in hazardous area.

2.1.3. Communication

It was a usual practice in Rades port, that before starting to lift up a container, signalman warned Botnia Seaways crewmembers who were on the weather deck and monitored cargo handling operations, however in this case no such warning was given. Failure to warn was what seaman and seaman-cadet were not expecting. At the moment of this accident signalman gave signal to crane operator only, and had not warned other persons on the weather deck.

2.2. Safety requirements when cargo operations are performed by shore personnel

Botnia Seaways crewmembers, who were in charge of monitoring of cargo unloading operations, were instructed that it is strictly forbidden to stand under the loading arm on the deck, or in the moving area of lifted cargo, while cargo is lifted. While discharging cargo in Rades port, they expected to be warned

before container lifting, and after the warning, they could move to a safe place. As they were not warned, they have not taken any precautionary measures on time to avoid the hazard.

Although Occupational Safety and Health Instruction No 8L provides, that persons not taking part in cargo handling operations, as well as other persons and passengers are not allowed to be on cargo deck during cargo handling operations, this requirement was not fulfilled. Deceased OS, OS, and seaman-cadet were not taking part in cargo discharge operations, but they walked on cargo decks and monitored cargo handling.

Occupational Safety and Health Instruction No 8L does not provide details on safety procedures for cargo handling operations when shore crane is used and when cargo handling operations are executed by shore personnel, it does not provide safety measures for the crewmembers who are involved in monitoring of cargo handling, there is no provisions for recommended place, in which they have to be situated when monitoring cargo handling. The latter instruction was never reviewed after it's adoption on 2 January 2008.

Cargo operation's procedure no. 7.4.0 is intended to ensure the safety of crew members, passengers, cargo and ship. It establishes an order for employee actions on board ships, assesses the risks that may arise during cargo handling operations. However, the procedure does not address the actions of the crew, their location, and the risks in cases when cargo handling is carried out not by the ship's crew.

After the accident, DFDS Seaways JSC took necessary safety actions to ensure the prevention of similar occurrences in the future. However, in order to ensure that DFDS Seaways JSC crews are fully instructed on relevant risks, the internal documents mentioned in this chapter are expedient to review. In reviewing, the special attention has to be given to occupational safety requirements, when a non-ship crew carries out container handling on Ro-Ro cargo decks.

SR-2018-L-01

It is recommended to DFDS Seaways JSC to review and supplement internal documents - Occupational Safety and Health Instruction No 8L and Cargo Operation's Procedure No. 7.4.0, by provisions for additional safety measures for container handling on ro-ro decks, and include cases, when cargo handling is performed by a non-ship crew.

2.3. Risk assessment

A standard set of risk assessments, approved on 1 July 1 2010, was used in Botnia Seaways. This risk assessment was not reviewed on February 2017, when Botnia Seaways started to operate in line Marseilles – Rades, although the working environment and the previously unidentified hazards have arisen - the ship's crew had heard of about an irresponsible stevedores in Rades port and about earlier accident during cargo handling. The above set did not cover a risk assessment that would include cargo loading/unloading, lashing/unlashing operations, when cargo handling is performed by shore stevedores. The Botnia Seaways crew did not assess this risk and did not take actions to reduce it. It is therefore important, that all information (including informal) and circumstances, that may have an impact on the risk level, is dully assessed. After the accident DFDS Seaways JSC took necessary corrective actions - reviewed and updated risk assessment.

Lithuanian Maritime Safety Administration, when carrying intermediate inspection on 18-19 December 2016 in Botnia Seaways, in accordance with the provisions of the ISM Code, did not plan to inspect and verify whether periodic risk assessment was performed and did not verify the implementation of the safety management system requirements related to risk assessment. It should be noted, that this was not the mandatory obligation of the Lithuanian Maritime Safety Administration, as such inspections should cover only a selective part of the elements of the safety management system.

In order to properly respond to new and emerging risks, arising during cargo handling operations, shipping companies should ensure, that the risk assessment on its vessels is carried out in a timely and sufficiently periodic manner. The Lithuanian Transport Safety Administration should strengthen supervision of the implementation of this requirement.

SR-2018-L-02

It is recommended to the Lithuanian Transport Safety Administration to prepare and implement a plan, according to which it will periodically check whether the companies operating ro-ro ships flying Lithuanian flag, properly ensures implementation of applicable risk assessment requirements for cargo operations on weather decks in its' ro-ro vessels.

3

CONCLUSIONS

Due to lack of cooperation of Tunisian Authorities, it was not possible to fully address all safety issues. However, based on evidences collected and their analysis, it was possible to draw the following conclusions.

3.1. Findings

The deceased OS was properly qualified, familiarised with all required documents regulating occupational safety, instructed in workplace concerning occupational health and safety, had a valid medical fitness certificate, was wearing all necessary personal protection equipment.

In the Botnia Seaways internal documents, setting up safety requirements during cargo handling operations, there were no detailed provisions on safety measures to be applied during container handling operations on Ro-Ro decks, especially when operations are executed by non-ship crew.

A standard set of risk assessments, applicable at the moment of the accident, was not periodically reviewed. This set did not include the risks associated with cargo loading and (or) unloading as well as lashing and (or) unlashings operations, when cargo lashing and (or) unlashings and cargo handling is the ultimate responsibility of shore stevedoring company.

In order to prevent the reoccurrence of similar accidents in the future, after the accident DFDS Seaways JSC took necessary safety actions.

3.2. Causes of the accident

Direct causes

1. Container was not lifted-up properly by the mobile shore crane. The lifting line was not straightforward, therefore, as a result of the lifting of the container, it gained a horizontal movement and hit the trailers, situated on the weather deck. Due to the impact trailers moved and pressed the seaman who was situated in between of two trailers.
2. The team of shore stevedores did not warn the Botnia Seaways crewmembers, situated in dangerous cargo handling area, about the container being raised.
3. The deceased seaman during discharge of container was in hazardous area and had very limited possibilities to escape to the safe zone.

Indirect causes

1. The unloading of container was started without discharging trailers from the weather deck, thus limiting possibilities for Botnia Seaways crewmembers, who were in charge to monitor cargo operations, to move to the safe place when container lifting started.
2. Time pressure forcing shore stevedores to be in a hurry when discharging the container.
3. Botnia Seaways crew's involvement in the inspection of the lashing state of the container. Following a request from the shore stevedores to verify whether the container is unlashed, the crew members were unreasonably involved in the inspection of the unloading container without taking any additional safety precautions.

4

SAFETY RECOMMENDATIONS

Safety recommendation: with a view to avoiding accidents and incidents in the future, the safety investigation authority drew up a proposal based on the information collected based on the safety investigation, and other sources, for instance, other safety studies.

Safety recommendations shall in no case create a presumption of blame or liability for an accident or incident.

SR-2018-L-01

It is recommended to DFDS Seaways JSC to review and supplement internal documents - Occupational Safety and Health Instruction No 8L and Cargo Operation's Procedure No. 7.4.0, by provisions for additional safety measures for container handling on ro-ro decks, and include cases, when cargo handling is performed by a non-ship crew.

SR-2018-L-02

It is recommended to the Lithuanian Transport Safety Administration to prepare and implement a plan, according to which it will periodically check whether the companies operating ro-ro ships flying Lithuanian flag, properly ensures implementation of applicable risk assessment requirements for cargo operations on weather decks in its' ro-ro vessels.

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