

Final report SHK 2023:11e

HUCKLEBERRY FINN – Crush incident
during loading operation in the Port of
Trelleborg, Sweden, 19 August 2022

File no. S-244/22

08 September 2023

SHK investigates accidents and incidents from a safety perspective. Its investigations are aimed at preventing a similar event from occurring in the future, or limiting the effects of such an event. The investigations do not deal with issues of guilt, blame or liability for damages.

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General observations

The Swedish Accident Investigation Authority (Statens haverikommission – SHK) is a state authority with the task of investigating accidents and incidents with the aim of improving safety. SHK accident investigations are intended to clarify, as far as possible, the sequence of events and their causes, as well as damages and other consequences. The results of an investigation shall provide the basis for decisions aiming at preventing a similar event from occurring in the future, or limiting the effects of such an event. The investigation shall also provide a basis for assessment of the performance of rescue services and, when appropriate, for improvements to these rescue services.

SHK accident investigations thus aim at answering three questions: *What happened? Why did it happen? How can a similar event be avoided in the future?*

SHK does not have any supervisory role and its investigations do not deal with issues of guilt, blame or liability for damages. Therefore, accidents and incidents are neither investigated nor described in the report from any such perspective. These issues are, when appropriate, dealt with by judicial authorities or e.g. by insurance companies.

The task of SHK also does not include investigating how persons affected by an accident or incident have been cared for by hospital services, once an emergency operation has been concluded. Measures in support of such individuals by the social services, for example in the form of post crisis management, also are not the subject of the investigation.

The investigation

SHK was informed on 2 September 2022 that a very serious marine incident involving the vessel HUCKLEBERRY FINN with the registration IMO number 8618358 and call sign SHLU had occurred on board during loading in the Port of Trelleborg, Skåne County, on 19 August 2022 at 21:00 hrs.

The incident has been investigated by SHK, represented by Kristina Börjevik Kovaniemi, Chairperson, Per Jakobsson, Investigator in Charge, Daniel Söderman, Operations Investigator, and Tomas Ojala, Investigator Rescue Operation.

Anders Wranå has participated as coordinator for Swedish Transport Agency and Ingela Andersson has participated as coordinator for the Swedish Work Environment Authority.

Investigation material

Interviews have been conducted with the company's safety manager, HR director, the master and other members of the crew who were involved in the occurrence. The driver of the semitrailer truck has been interviewed.

Factfinding presentation meetings with the interested parties were held on 8 March 2023, one digital and one in-person meeting. At these meetings SHK presented the facts discovered during the investigation, available at that time.

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Ship particulars

Flag/register	Sweden
Identification	
IMO number/call sign	8618358/SHLU
Vessel data	
Type of ship	RoPax ferry ¹
New building shipyard/year	1988
Gross tonnage	26,478
Length, overall	177.2 metres
Beam	26 metres
Draft, max.	5.75 metres
Deadweight at max. draught	6,254 tonnes
Cargo deck	3
Cargo capacity	2,200 loading metres
Passenger capacity	400
Service speed	
Ownership and operation	TT-Line AB, subsidiary of TT-Line GmbH & Co. KG in Germany
Classification society	DNV
Minimum safe manning	16

Voyage particulars

Ports of call	Trelleborg, Skåne County
Type of voyage	Alongside at terminal
Cargo information/passengers	1,870 loading metres/321 passengers
Manning	45

Incident information

Type of incident	Serious marine incident
Date and time	19/08/2022 at 21:00 hrs
Position and location of Incident	Lat. 55° 22.1' N Long. 013° 08.9'E
Weather	Wind from NNE 3 m/s, air temperature c. 20°C, cloudy and occasional showers
Other circumstances	
Consequences	
Injuries to persons	1
Environment	
Vessel	

¹ RoPax – roll-on/roll-off vessel that takes passengers and is loaded/unloaded through the cargo being driven on board.

SUMMARY

Loading of the RoPax vessel HUCKLEBERRY FINN began on the evening of 19 August, ahead of a departure for Poland. It was expected that the vessel would be fully loaded with vehicles. The cargo primarily consisted of semi-trailer trucks, but also a small number of cars and buses. The crew on the cargo deck were responsible for loading.

Loading of the vessel took place through a cargo officer distributing the vehicles between different cargo decks, where additional crew members directed the vehicles to a parking space. The main deck was made up of six lanes distributed evenly on either side of the vessel's centre casing. Two ordinary seamen were responsible for loading on their individual sides of the main deck. One of the two ordinary seamen was in charge of a deck apprentice who was only observing the loading.

The ordinary seamen initially worked in the same lane, loading the first two semi-trailer trucks. In conjunction with loading, the first semi-trailer truck needed to be reversed. No check took place to verify that the space behind the semitrailer truck was clear. Nor had the reversing manoeuvre been communicated to the two other crew members on the main deck. At the same time, the second semitrailer truck was directed to park behind the first. Once the second semitrailer truck had been parked, one of the ordinary seamen walked between the two semitrailer trucks and was crushed between them. The driver of the parked semi-trailer truck saw what was happening and reversed his vehicle. At which point the ordinary seaman fell onto the cargo deck, in a lot of pain but conscious.

An ambulance was called but, due to misunderstanding in the communication between the crew and the terminal staff, there was a delay before the alarm call was made. The ordinary seaman suffered no lasting injuries and was able to return to work after a period of sick leave.

Causes of the accident

Deficiencies in the company's risk analysis and procedures have led to the semi-trailer truck being reversed without it first having been ensured that the space behind the semi-trailer truck was clear of obstructions.

Contributing factors have been that the ordinary seamen have had to work without the support of more experienced crew, in spite of the fact that they had limited experience of the duties. Shortcomings in terms of communication have also contributed to the crew not understanding each other's intentions in conjunction with the loading procedure.

Underlying factors were that:

- instructions concerning duties were communicated in Swedish, which has resulted in those members of the crew who did not speak Swedish not having received complete information about the work involved in the loading operation and the prerequisites for this,

- the company had not ensured that the crew had the knowledge required in order to perform their duties, and
- there were no established instructions for how vehicles were to be reversed on the cargo deck.

Safety recommendations

TT-Line GmbH & Co. KG is recommended to:

- Ensure that appropriate action is taken for the purpose of managing and communicating risks identified as being present in conjunction with loading and unloading (see section 3.2). (*SHK 2023:11 R1*)
- Revise its procedures with respect to how instructions and other information are conveyed to all concerned parties on board (see section 3.2). (*SHK 2023:11 R2*)
- In the event of an emergency, ensure that the person who contacts external assistance is able to convey an up-to-date view of the emergency situation (see section 3.3). (*SHK 2023:11 R3*)

The Swedish Transport Agency is recommended to:

- Investigate how equivalent supervision of the work environment can be ensured for vessels that have delegated supervision and for vessels on which the Swedish Transport Agency conducts periodic supervision. This investigation should include an assessment of what consequences the difference in how the work environment is supervised may have from the perspective of safety. (see section 3.5). (*SHK 2023:11 R4*)

1. FACTUAL INFORMATION

1.1 Sequence of events

1.1.1 General

At around 21:00 hrs on 19 August 2022, loading of the RoPax vessel HUCKLEBERRY FINN began ahead of a departure for Poland. The cargo consisted mainly of semi-trailer trucks but there were also cars, camper vans, caravans and a bus. The crew had one hour in which to complete loading before departure at 22:00 hrs.

The vessel was expected to be fully loaded and the vehicles were therefore to be parked close together. The second officer was responsible for loading and he was assisted by two ordinary seamen² on deck 2 (main deck), an able seaman² and a chief officer on deck 3 (trailer deck) and two able seamen on deck 5 (weather deck). Communication between the second officer and the other crew members involved in loading took place in Swedish by means of radio.

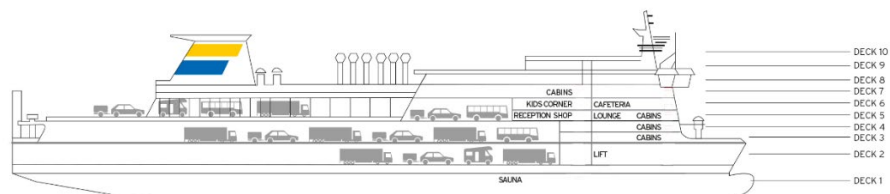


Figure 1. Side view of the vessel's various decks. Image: TT-Line AB, edited by SHK

The duties of the crew included i.a. directing vehicles and guiding them to the correct location. They were also to pull electrical cables to the semitrailer trucks that needed electricity for their refrigeration units during the voyage. Semitrailer trucks that needed an electrical connection displayed a sign to indicate this in their windscreen. This made it easy for the crew to identify which semitrailer trucks needed electricity when they were directing the semitrailer trucks to a parking space.

The second officer, two ordinary seamen (A and B) and a deck apprentice were on the main deck during loading. The second officer stood on the forward ramp and indicated to the semitrailer truck drivers when they could drive on board and distributed the semitrailer trucks between the port and starboard sides of the main deck. The second officer used the radio to convey to the ordinary seamen information about which lanes the semitrailer trucks were to be loaded into and whether an electrical connection was needed.

The communication between the drivers and the crew members during loading took place through hand signals and a whistle. The crew who

² Qualification levels for seafarers, see Chapter 2, Sections 11–13 of the Swedish Ordinance on Qualifications for Seafarers (2011:1533).

participated in loading wore yellow high-visibility clothing equipped with reflectors, and the deck apprentice, who was not participating in loading, wore an orange vest that was marked 'Cadet'.

The main deck was divided into six different lanes with the designations A to F, from starboard to port. Ordinary seaman A was responsible for loading the starboard side and ordinary seaman B was responsible for the port side of the centre casing³. Ordinary seaman A was a little uncertain about how to load the first semi-trailer truck next to the aft ramp in lane C. Consequently, ordinary seaman B offered to help with reception and parking of the first semi-trailer truck. Ordinary seaman B therefore took over these duties and they agreed that ordinary seaman A would then continue with the subsequent vehicles in lane C. Ordinary seaman B would return to loading on the port side. Refer to Figure 2 for the locations of those involved.

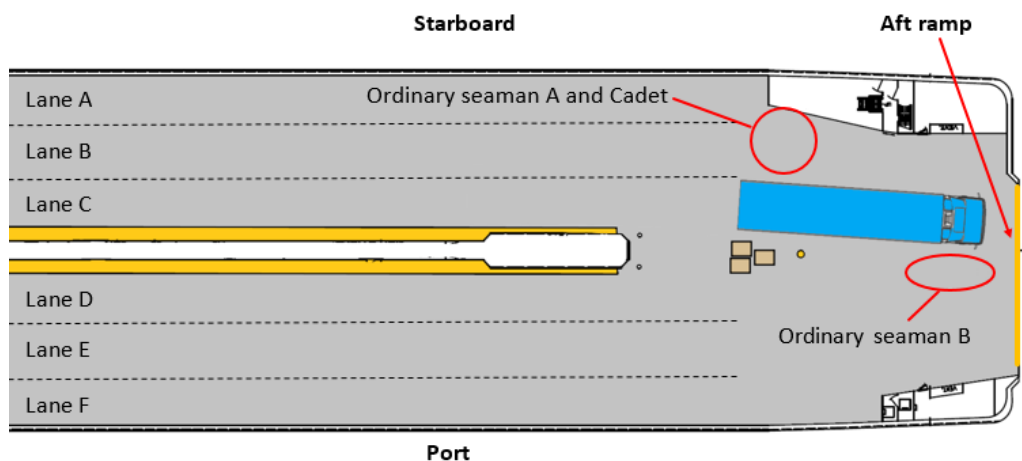


Figure 2. Sketch showing how the first semi-trailer truck on the starboard side was directed forward. The centre casing is marked in white and yellow.

Ordinary seaman B directed the semitrailer truck from its right side and moved between the centre casing and the aft ramp in the vessel's centreline. When the semitrailer truck was two to three metres from the aft ramp ordinary seaman B signalled with his whistle that the semitrailer truck was to stop because an object had become stuck under the trailer. Ordinary seaman A heard the stop signal and saw that the semitrailer truck stopped. The driver had the right side window open and also saw ordinary seaman B in the right wing mirror. Ordinary seaman B directed the driver to reverse in order to allow the ordinary seaman to remove the object. The driver was not paying any attention to the left side of the semitrailer truck but knew that there were two people there. Ordinary seaman A and the deck apprentice were standing on the left side of the semi-trailer truck, the semi-trailer truck was therefore blocking the view between them and ordinary seaman B (see Figure 3).

³ Centre casing – Stairwell in the middle of the car deck, which also contains lifts, ventilation spaces, electrical connections etc.

While the first semi-trailer truck was being driven on board another semi-trailer truck had been directed into the same lane. There was a sign in the windscreen of this semi-trailer truck to indicate that it was to be connected to the ship's electrical supply. The second semi-trailer truck rolled onto the car deck towards the first semi-trailer truck and ordinary seaman A directed it to park behind the first one.

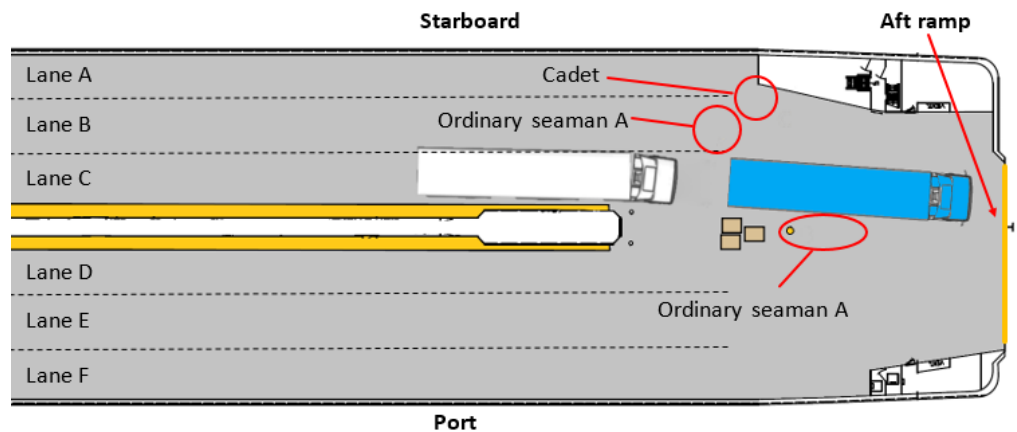


Figure 3. Sketch showing how the first semi-trailer truck was stopped and another semi-trailer truck was directed towards the first by the ordinary seaman A. At that time ordinary seaman B was standing by the pillar in the centreline of the vessel.

Ordinary seaman A walked in between the semi-trailer truck in order to get an electrical cable that was in the centre casing on the other side of the semi-trailer truck when the first semi-trailer truck began to reverse. Ordinary seaman A attempted to get back but was not able to make it all the way out and was crushed between the semitrailer trucks (see Figure 4).

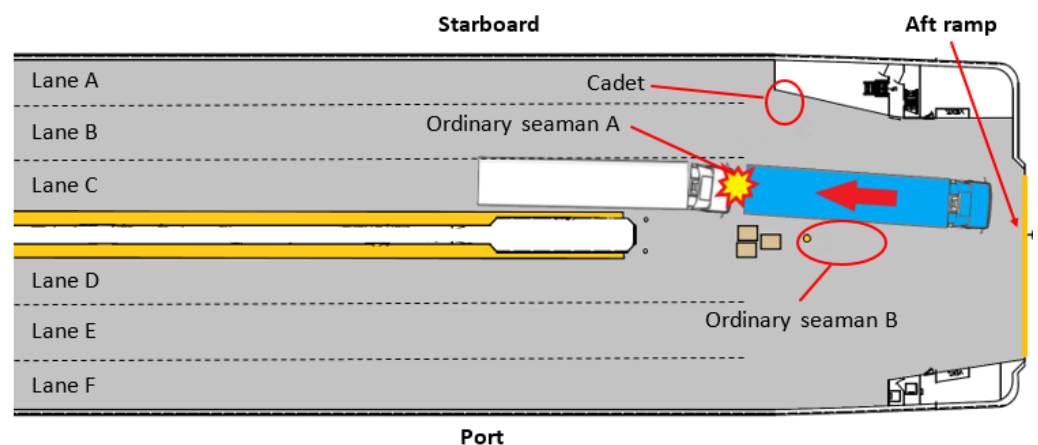


Figure 4. Sketch showing how ordinary seaman A walked between the semi-trailer truck at the same time as the first semi-trailer truck reversed and crushed ordinary seaman A.

The driver of the first semi-trailer truck, which was reversing, felt resistance and understood that something had happened and therefore stopped. The driver of the second semi-trailer truck saw what was happening and began to reverse. When the pressure from the semi-

trailer truck decreased, ordinary seaman A fell down onto the floor, unable to get up but conscious.

At the same time as the first semi-trailer truck stopped reversing, ordinary seaman B heard a sound behind the trailer, rushed to see what had happened and found ordinary seaman A lying on the floor behind the semi-trailer truck. When the driver of the first semi-trailer truck realised that something was wrong, the driver drove forward a little bit and then got out and saw that ordinary seaman A was lying behind the semi-trailer truck.

The deck apprentice called for help over the radio, which was received by the second officer. After a minute or so the second officer was the first to arrive at the location, followed by the master and other members of the crew. They quickly established that an ambulance was needed and the master asked the terminal staff to contact SOS Alarm.



Figure 5. The semitrailer trucks immediately after the occurrence. Image: from the crew.

1.1.2 Emergency response

The crew contacted TT-Line AB's terminal staff in the port check-in area by radio when they realised that ordinary seaman A was seriously injured. The crew wanted the terminal staff to call SOS Alarm and open the gates to the port area for the ambulance. The terminal staff misunderstood the crew and therefore did not call SOS Alarm, and instead awaited further instructions from the crew. After the crew contacted them once again the terminal staff called SOS Alarm 15 minutes later at 21:18 hrs.

SOS Alarm called out an ambulance but the terminal staff had not been able to provide any details about the accident that the SOS operator could share with the ambulance crew. Consequently, the SOS operator had to call the terminal staff again, who in turn contacted the crew, and

it was only then that it was possible to provide the ambulance crew with further information. Once the ambulance arrived, the ordinary seaman was examined and was then taken to hospital for further investigations and observation for three days.

1.1.3 *Actions following the occurrence*

The company's shore organisation was never involved at the time of the accident because the crew made the assessment that they were able to deal with the situation on board.

Following the accident the crew members concerned were gathered together on the bridge and went through what had happened. The meeting was held in Swedish and a Polish-speaking able seaman translated what was being said for ordinary seaman B.

The master sent a report (in English) to the company's quality and safety department two days after the occurrence. The report described the occurrence and what had caused it. As preventive measures, an alternative method of pulling the electrical cable to semitrailer trucks that were to be connected to the electrical supply was proposed.

The occurrence was also reported to the Swedish Social Insurance Agency. The crew were under the impression that only occurrences involving property damage to the vessel or, for example, port facilities were to be reported to the Swedish Transport Agency. It was only after the Swedish Transport Agency had reminded the company that they had to submit a report about the marine casualty that the company submitted a report, two weeks after the occurrence.

1.2 *Injuries to persons*

The ordinary seaman suffered severe pain but no fractures or known lasting injuries and returned to work on board the vessel after a period of sick leave.

1.3 *Ship particulars and description of the main deck*

1.3.1 *Ship particulars*

The vessel, a RoPax vessel, was built in 1988 in Germany and was given the name NILS DACKÉ. The name of the vessel was changed to PETER PAN in 1993 before finally being given the name HUCKLEBERRY FINN in 2002. The vessel was able to carry 2,200 metres of rolling cargo, distributed between three decks. The rolling cargo was loaded onto deck no 2, 3 and 5. Loading and unloading of decks 2 and 3 was possible via ramps directly from the quay, while deck 5 was reached via internal liftable ramps from deck 3. The vessel was originally also able to transport railway carriages on deck 2, but the tracks were no longer in use at the time of the accident.

The vessel was able to accommodate 400 passengers. There were 133 passenger cabins on board, with a total of 324 beds. The vessel departed from Trelleborg and sailed mainly to Travemünde and Rostock in Germany, but occasionally also to Świnoujście in Poland and Klaipėda in Lithuania.

1.3.2 *Main deck*

The main deck consisted of a total of six lanes intended for wheeled vehicles. The deck was divided along the length of the ship by a centre casing that was 2–3 metres wide. In the aft portion of the deck, the centre casing stopped c. 27 metres from the aft ramp. Between the centre casing and the aft ramp there was a pillar that supported the deck above. There were 14 metres of deck between the column and the aft ramp.

It was not possible to use the space between the centre casing and the column for cargo and it was therefore used to store a variety of stowage equipment and for engine supplies that were delivered to the vessel. There was also a desk and some waste bins by the pillar (see Figures 6 and 7).



Figure 6. The picture is taken from the stern facing forward, in towards the car deck, and shows the pillar in the centreline and the aft edge of the centre casing where the electrical cables were hung.



Figure 7. The picture is taken amidships and towards the aft ramp in lane C. The centre casing can be seen on the right of the picture and the pillar is just behind that in the centreline.

1.4 The semitrailer trucks and the driver

The first semi-trailer truck that was involved in the occurrence was a truck with a three-axle trailer that had a soft cover on the sides and solid doors at the rear. The second semi-trailer truck was a truck with a refrigerated trailer that needed an electrical supply during the crossing. Both semi-trailer trucks were 16.5 metres long.



Figure 8. The first semitrailer truck. The picture is after the accident once the other semitrailer truck had reversed away. Image: Swedish Police Authority.

The driver of the first semi-trailer truck had c. 25 years' experience driving semi-trailer trucks and regularly travelled by ferry about twice a week. The driver had begun his journey at around 01:00 hrs in order to be in Gothenburg in the morning and then drove on to Stenungssund to load. He arrived in Trelleborg at around 16:00 hrs, where he stopped until it was time to drive on board HUCKLEBERRY FINN. The driver has stated that he drank two beers before driving on board the ferry.

1.5 Personnel information

The crew consisted of a total of 45 people, 16 of whom were included in the minimum safe manning. The minimum safe manning was made up of a master, a chief officer, two second officers, who also worked as cargo officers, and five deck crew (three able seamen and two ordinary seamen), five engineering crew and two commissary crew. The minimum safe manning is the lowest number of people from a crew who are required in order to operate the vessel. Depending on operations and the amount of passengers and cargo, the number of crew can be increased when necessary. Consequently, at the time of the occurrence, there were two additional deck crew and extra engineering and commissary crew, adding up to a total of 27 extra people on board.

According to the Ordinance on Qualifications for Seafarers (2011:1533), different qualifications are required for different positions in order to be included in the minimum safe manning on board a vessel. Fundamentally, each position is based on a certain basic training that can, once on-board experience has been obtained, be converted into qualification for a new more senior position on board. For example, the requirement in order to sign on as an ordinary seaman on board was to have passed a three-year upper secondary school study programme and 60 days of work experience on board a vessel. After having served as an ordinary seaman for an additional 18 months, it was possible for the person to request the qualification able seaman and sign on in this position. Only the number of actual days on board were counted towards the qualification requirement. The basic premise is that with more experience you can be given more responsibility for various duties on board.

The majority of the crew were Swedish-speaking. However, a few members of the crew had a limited proficiency in Swedish, including ordinary seaman B. Much of the day-to-day communication took place in Swedish, and English was used when necessary as a common language.

1.5.1 *Master*

The master had worked on board HUCKLEBERRY FINN since the end of the 1990s and had held the position of master for many years.

1.5.2 *Chief officer*

The chief officer had worked on various ferries owned by the company since 2008, mainly as second officer. He had been working on HUCKLEBERRY FINN for the past year and as chief officer since the week prior to the accident. In addition to the task of driving the vessel, the chief officer on HUCKLEBERRY FINN is also responsible for daily scheduling of staff.

1.5.3 *Second officer*

The second officer had been working as crew on the company's vessels since 2009 and exclusively onboard HUCKLEBERRY FINN since 2019. The position encompassed operational responsibility during loading and the position was therefore often named cargo officer. In 2022, the second officer had worked on board for 83 days, prior to this he had a total of almost 900 days on board in his current position.

1.5.4 *The ordinary seamen*

Ordinary seaman A signed on on the vessel for the first time in January 2022 as part of an internship within the scope of the ordinary seaman's education. Having completed the internship, ordinary seaman A began working as substitute on board in June of the same year. Ordinary seaman A had worked on board for a total of 44 days, 36 of which as an ordinary seaman. At the time of signing on for the first time, familiarisation training and an induction training programme were completed on the vessel.

Ordinary seaman B signed on for the first time in May 2022. Aside from Polish, ordinary seaman B also spoke English, but did not have proficiency in Swedish. The ordinary seaman was studying at a maritime university in Poland but worked on board during the summer of 2022 and had a total of 75 days on board the vessel as an ordinary seaman. The crew had good confidence in the ordinary seaman, who had been working longer shifts on board since spring. At the time of signing on for the first time, familiarisation training and an induction training programme were completed.

Before the occurrence the two ordinary seamen had previously worked together for a few days but had not as part of the loading operation together. They had had some communication difficulties, which led to misunderstanding on a few occasions. As a result they were not scheduled to work together on additional days.

1.5.5 *The deck apprentice*

The deck apprentice had come on board the day before the occurrence and had not yet completed their familiarisation training on board. Consequently, the deck apprentice was not participating in loading or included in the safety management system at the time of the accident. In order to familiarise themselves with the work on board, the deck apprentice was given permission to shadow ordinary seaman A and observe loading.

1.6 Accident site

The accident took place on the main deck close to the aft ramp. The deck was essentially empty when the first semi-trailer truck drove into lane C and was stopped by ordinary seaman B. The rear end of the first semitrailer truck stopped c. 18.5 metres forward of the aft ramp. The next semi-trailer truck stopped just behind the first and covered the remaining space aft of the centre casing.

Both of the semitrailer trucks were therefore covering the entire space and c. 10 metres of the centre casing. The power supply cable that was supposed to be connected to the second semitrailer truck was attached to the aft part of the center casing. The shortest route by which to fetch the electrical cable was therefore to walk between the semitrailer trucks.

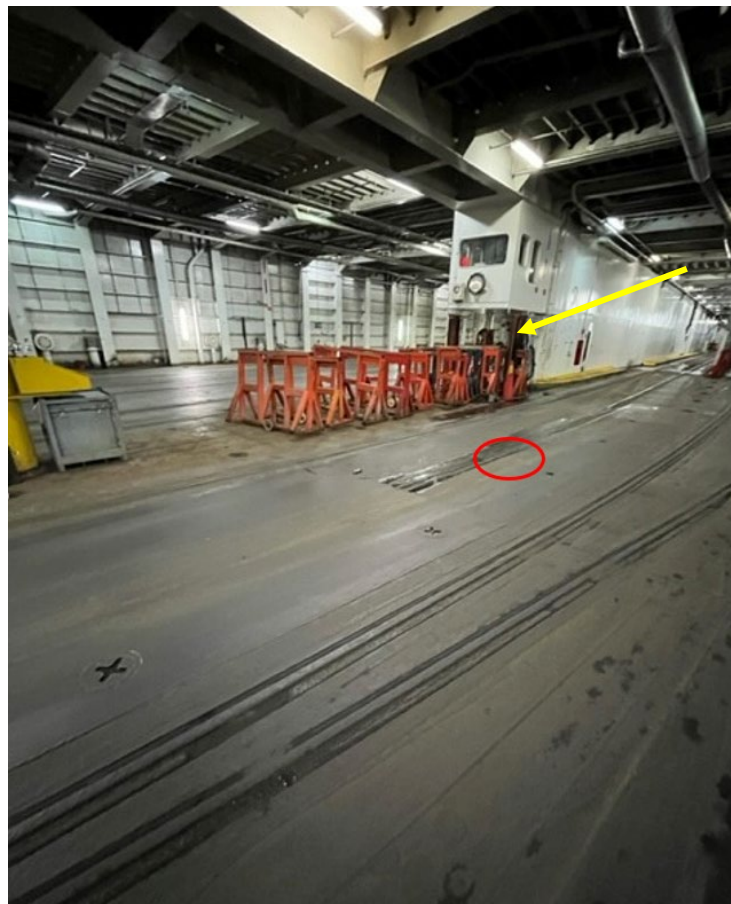


Figure 9. The red ring shows the approximate location where ordinary seaman A was crushed between the semitrailer trucks. The yellow arrow indicates where the electrical cables were stored. Markings inserted by SHK.
Image: The crew.

1.7 The company

TT-Line AB is a Swedish company based in Trelleborg and is the employer of the crew of two Swedish-flagged vessels that are owned and operated by the German parent company TT-Line GmbH & Co. KG (the company). The company operates ferry services with nine different RoPax vessels that sail between Sweden, Germany and Poland. The company was founded in 1962 when its first ferry started

sailing between Trelleborg and Travemünde. All functions related to the safety management system were located at the head office in Travemünde, while work environment management was led from the office in Trelleborg.

1.8 Requirements concerning accident prevention measures for vessels

A shipping company engaged in international maritime transports using ships of a certain size are subject to requirements in respect of a safety organisation in accordance with the International Safety Management Code (ISM Code)⁴. Regulation (EC) No 336/2006 of the European Parliament and of the Council⁵ refers to the ISM Code. The Marine Labour Convention (MLC)⁶ contains requirements in respect of working conditions and the work environment on board. The requirements in respect of certificates (Marine Labour Certificates) and the assurance of compliance with the code apply to vessels over a certain size that are used in international traffic⁷.

Requirements in respect of the work environment on board vessels are governed under national law mainly in the Vessel Safety Act (2003:364) and the Work Environment Act (1977:1160), as well as their associated ordinances and regulations.

The Swedish Transport Agency's regulations (TSFS 2019:56) on work environment on vessels and the Swedish Maritime Administration's code of statutes (e.g. SJÖFS 2005:25 on safety devices and safety measures) contain more detailed regulations concerning work on board vessels. The Swedish Work Environment Authority's regulations that are applicable to work on board are set out in TSFS 2019:56. The regulations that are to be applied include the Swedish Work Environment Authority's regulations (AFS 2001:1) in respect of work environment management.

1.8.1 Requirements in respect of a safety management system

Regulation (EC) No 336/2006 (Annex I, Part A, 1.1.4) defines a safety management system as a structured and documented system enabling company personnel to implement effectively the company safety and environmental protection policy. The shipping company shall ensure that, for the shipping company's operations, there is a clear safety management system with established emergency procedures and a crew that has trained in and practised dealing with emergency situations. Furthermore, there is a requirement for systems for reporting accidents and incidents in order to enable the organisation to prevent similar occurrences. The personnel shall be given information about the safety

⁴ ISM Code – International Safety Management Code.

⁵ Regulation (EC) No 336/2006 of the European Parliament and of the Council of 15 February 2006 on the implementation of the International Safety Management Code within the Community and repealing Council Regulation (EC) No 3051/95.

⁶ MLC – Marine Labour Convention.

⁷ Chapter 3, Section 9a and b of the Vessel Safety Act.

management system in an established working language or a language they understand and are able to communicate in effectively when they are performing duties related to the safety management system.

The company's safety management system

The company had documented its safety management system both in terms of those parts that are common to the entire company (main manual), and in terms of vessel-specific documents.

The main manual applied to all of the parent company's vessels, regardless of where the vessel was registered. The company had chosen to use English for all documentation and communication concerning the safety management system. The main manual adhered to the structure of the ISM Code and described, among other things, the company's organisation, emergency preparedness, management of staff, emergency procedures, reporting etc. The system was available in a digital format and is primarily communicated digitally to the various vessels.

The vessel-specific documents described, among other things, the organisation and responsibilities on board the specific vessel. The system also encompassed detailed job descriptions and checklists for induction training and familiarisation training.

Familiarisation training and induction training

As part of the company's safety procedures a new employee or an employee who took on a new position was to have completed a familiarisation training programme⁸ and an induction training programme⁹. The training programmes were completed during the first week the person was on board.

The aim of familiarisation training was to provide knowledge about the safety management system of the specific vessel. This addressed matters such as organisation, areas of responsibility, fire, evacuation, life-saving and maritime security.

The aim of the induction training was to provide knowledge about operating procedures, the vessel's equipment, watchkeeping, safety and the environment in order to enable the new employee to work in their position on board.

The checklists were used to tick off different components of each training programme. Having completed the training programmes, the checklists were signed by the employee and the officer in charge. They were then sent to the company's head of training who issued a certificate as proof that the training was complete. Once the certificate was signed, the new employee was able to be included in the vessel's

⁸ Chapter 4, Section 3 of the Vessel Safety Act.

⁹ Chapter 4, Section 5 of the Vessel Safety Act.

safety management system and was formally approved to work in their intended position on board.

Cargo handling and handling of electrical connections are mentioned in the checklist for the induction training programme, but without more detailed instructions. Knowledge about how the work was expected to be performed was conveyed through experienced crew demonstrating and describing the duties to the person who was to be instructed.

Depending on their previous experience, a new crew member could be given varying amounts of responsibility, but standard practice was to allow less experienced staff to start working together with a person with more experience. There was a view on board that up to six months' experience working on board was required before an ordinary seaman would be able to work independently. Consequently, depending on how frequently different duties were performed, the time taken to learn a task could vary. Reversing vehicles was a duty that was rarely performed.

Raising the alarm

The company's common main manual for the safety management system described how the company's emergency organisation was to be activated. It also contained the contact details of various rescue services for the various ports at which the vessel called. The company's emergency organisation was to be activated through the master calling numbers on a telephone list until someone from the company's organisation answered.

Reporting

Reporting of accidents and incidents was described in the company's main manual, with a number of common definitions and different procedures for reporting depending on the flag under which the vessel was sailing. A number of different occurrences were defined, e.g. accident, incident and non-conformity.

The main manual indicated that all the defined occurrences were to be reported internally to the company's safety and quality department. It was stated under a separate heading that the Swedish-flagged vessels were also to report workplace accidents ('labour accidents') to the Swedish Social Insurance Agency.

The same manual stated that, in the event of a marine casualty ('marine accident or incident'), reporting to the authorities in the flag state was to take place without delay. For a description of how reporting was to be done, reference was made to a specific ISM instruction. The ISM instruction was adapted for vessels under German, Swedish and Cypriot flags.

Investigation of accidents and incidents

The main manual described how incidents were to be investigated and followed up. According to the manual all relevant data was to be gathered and the circumstances surrounding the incident were to be established. Action was then to be taken for the purpose of preventing similar occurrences from happening again.

1.8.2 Requirements in respect of systematic work environment management

Systematic work environment management on Swedish vessels is mainly governed by the Work Environment Act and the systematic work environment management regulations (AFS 2001:1). These govern, among other things, what responsibility the employer has with respect to the employee, as well as matters pertaining to information to the employee, risk analyses, action plans and follow-up.

The employer has to ensure that the employee gains good knowledge of the circumstances under which the work is to be conducted, and ensure that the employee is informed of the risks that may be associated with the work. The employer has to ascertain that the employee has the training required and knows what he or she has to do in order to avoid the risks associated with the work. The employer must ensure that only employees who have received sufficient instructions have access to areas where there is a clear and present risk of illness or accidents. (Chapter 3, Section 3 of the Work Environment Act).

The Work Environment Act does not govern the matter of working language. However, the basic premise applied by the Swedish Work Environment Authority is that information provided to the employee has to be provided in a language that allows the employee to understand the meaning of the information fully so that they are able to perform their duties in a safe manner.

The aim of the Swedish Work Environment Authority's systematic work environment management regulations is to help the employer create a framework to prevent ill health and to promote a good work environment. In more concrete terms, what this means is that the employer has to systematically investigate, analyse, assess, mitigate and follow up risks in the work environment at a workplace.

The Swedish Transport Agency has published a guide for systematic work environment management¹⁰ that is intended to help shipping company's and on-board employees create effective work environment management that contributes to good working conditions on board. The guide states that it is also intended as a support tool for the Swedish Transport Agency and the staff of recognised organisations when they are conducting supervision of the systematic work environment

¹⁰ The guide is available from the Swedish Transport Agency's website [vägledning-systematiskt-arbetsmiljoarbete-2.0.pdf](https://www.transportstyrelsen.se/arbetsmiljoarbete-2.0.pdf) (transportstyrelsen.se).

management on board. This guide can be downloaded from the Swedish Transport Agency's website and is written in Swedish. The guide stresses the importance of having written instructions for work that involves serious risks. These instructions have to be easy to understand. The employer is also obliged to check that employees understand the instructions and to supplement these, where necessary, with verbal instructions.

The company's systematic work environment management

The company had vessels under various flags that are subject to different regulatory frameworks. Consequently, work environment management is not organised in the same way for each of the company's vessels. Under Swedish law, the MD of TT-Line AB was responsible for the company's work environment. The MD had delegated the task of implementing the company's work environment management to the master of each vessel. The company's main manual for the safety management system referred to the fact that information concerning systematic work environment management was available on board and at the office in Trelleborg.

The practical work involved in the systematic work environment management on board included regular safety committee meetings with participants from the different departments on the vessel, safety representatives and the master. Standing items at safety committee meetings were safety rounds, reported injuries and action plans, as well as other matters. The meetings were held in Swedish and the minutes were taken, with some exceptions, only in Swedish. It is evident from the minutes that in 2022 the crew had raised the issue of language difficulties with non-Scandinavian crew who, according to one proposal, should therefore not be included in the safety management system.

Risk assessment for loading and unloading

In January 2020 the company conducted a risk assessment for loading and unloading within the scope of its systematic work environment management. The risks identified were crush injuries, the risk of collision, hearing damage and inhalation of fumes. The likelihood of these risks was indicated as significant, four on a five-point scale. The risk assessment was conducted in English and the various risks were not assessed individually. According to the minutes of the safety committee meeting that SHK has studied there are no notes to the effect that the risks assessments have been discussed or reviewed.

In the risk assessment, all the risk-mitigation measures were summarised in a list that was not possible to derive from a specific risk. Risk mitigation measures that relate to the risk of collision were that the crew were to wear reflective overalls, yellow reflective gloves and to use a whistle as a stop signal. Other measures that could potentially relate to the prevention of collisions were that the person directing traffic was to stand where they are visible to the driver and not directly behind reversing vehicles.

There was an instruction concerning loading and unloading of vehicles that did not have their own tractor unit and were therefore driven on board by the stevedores. This instruction emphasised the importance of eye contact with the driver, clear hand signals and audio signals for communicating with the stevedores driving the vehicles.

1.8.3 Supervision

The Swedish Transport Agency is responsible for supervision of safety and the work environment on board vessels (Chapter 5, Section 1 of the Vessel Safety Act). This responsibility includes supervision of the vessel's safety management system and systemic work environment management. Supervision of the work environment on board shall take place in cooperation with the Swedish Work Environment Authority (Chapter 5, Section 1, paragraph five). The Swedish Transport Agency is allowed to delegate some aspects of supervision to a recognised organisation (Chapter 7, Section 11). There are no provisions regarding the transfer of supervisory duties under the Work Environment Act.¹¹

Starting on 23 March 2021 DNV had been engaged to conduct certain supervisory duties on the vessel HUCKLEBERRY FINN. The contract encompassed supervision of, among other things, the vessel's safety management system (SMC)¹² and the MLC. Even though certain supervisory duties had been delegated, the Swedish Transport Agency was still responsible for those aspects of supervision that had not been delegated. Prior to the Swedish Transport Agency delegating supervision of the MLC, supervision of the systematic work environment

¹¹ Cf. Govt Bill 2012/13:110, pp. 12 and 34.

¹² SMC – Safety Management Certificate.

management was included as part of the periodical MLC inspections and seaworthiness surveys.

With regard to the provisions in the MLC, these are only partly equivalent to the requirements in the national work environment legislation. Overarching requirements that a member state shall adopt regulations concerning the protection of health and safety and prevention of accidents, which partly includes systematic work environment management, are contained in Standard A4.3.1 of the MLC. DNV has conducted supervision in accordance with the requirements set out in the MLC and in accordance with the DMLC I¹³ issued by the Swedish Transport Agency.

Supervision conducted on the vessel

SHK has chosen to look in more detailed on the supervision conducted after 2018. However, SHK also noted that the Swedish Transport Agency issued a deviation in 2016 regarding the safety organization and the crew's ability to communicate during a fire drill on board. Not everyone spoke Swedish, which led to misunderstanding. At that time, Swedish was the working language for the vessel's safety management system.

The Swedish Transport Agency conducted on-board supervision of the vessel's safety management system and parts of its work environment management in conjunction with annual seaworthiness surveys until 2021. The systematic work environment management was inspected specifically in conjunction with the issuance of MLC certificates in 2013 and 2019, with an intervening inspection in 2017. In conjunction with these surveys, a non-conformity has been noted in respect of cleanliness in the engine room.

In addition to the aforementioned inspections, the Swedish Transport Agency also conducted annual inspections of the company's safety management system.

In conjunction with supervision of the vessel being delegated to a recognised organisation in 2021, DNV conducted supervision of the vessel's safety management system and parts of the work environment that have been included in the MLC certification. Following this delegation, the Swedish Transport Agency has not conducted or planned any periodic surveys in respect of the systematic work environment management. Supervision of the work environment is reported to, following delegation, take place through inspections or based on received reports or notifications.

DNV made two observations concerning the work environment during its inspection of the MLC in 2021. These related to rectification lists from accommodation inspections and hours of rest.

¹³ DMLC I – Declaration of Maritime Labour Compliance – Part I.

2. ACTIONS TAKEN

The company has begun the process of producing an English language manual for its systematic work environment management.

The company has also conducted its own investigation of the occurrence and has subsequently taken corrective action. The investigation report has been communicated to all of the company's vessels. The actions taken include training the crew on work procedures on the cargo deck and a new procedure for how electrical connections are to be handled.

3. ANALYSIS

The accident occurred during the loading of the vessel. On a vessel that is loading vehicles the driver of a vehicle is expected to follow the instructions given by the crew. Consequently, SHK has chosen to analyse the procedures that were in place for loading, how the crew were trained for these duties and how the risks associated with loading have been identified and managed by the company.

The analysis also addresses how the alarm was raised by the vessel, which delayed the arrival of the ambulance at the accident site. However, no delays or other deviations have been identified in how the alarm was raised or with the emergency response after the alarm call was received by SOS Alarm. Accordingly, SHK has not found any reason to conduct further analysis of other parts of the emergency response.

In addition to the direct causes of the accident SHK has also had cause to investigate how the safety management and work environment management have been conducted on board and how the supervision of, primarily, the work environment has been conducted.

3.1 Sequence of events

According to the vessel's procedures, the ordinary seamen were to stow vehicles in different lanes. However, ordinary seaman A, who had been allocated the starboard side of the main deck, had limited experience of loading in the first position towards the aft ramp and therefore got help with this from ordinary seaman B. The cargo officer who was distributing the vehicles on the vessel did not receive information about this and continued working without interrupting loading.

When the first semitrailer truck approached, ordinary seaman B directed the semitrailer truck from in front to the right of it. Ordinary

seaman A and the deck apprentice were on the left side of the semitrailer truck and the semitrailer truck therefore ended up obstructing the view between the ordinary seamen when it was being driven forward towards the aft ramp.

At the same time as ordinary seaman B was working with the first semitrailer truck the cargo officer had let another semitrailer truck on board. Ordinary seaman A, who was under the impression that the first semitrailer truck was parked, directed the second semitrailer truck to park behind the first and then walked between the vehicles in order to get an electrical cable. At the same time, ordinary seaman B signalled to the driver of the first semitrailer truck to reverse so that the ordinary seaman could remove an object that had become trapped under the wheel of the trailer. However, this was done without first checking that the space behind the semitrailer truck was clear. Ordinary seaman A, who was between the semitrailer trucks, was then crushed between them.

3.2 Factors that affected the sequence of events

The factors that have been deemed to have affected the sequence of events relate primarily to the training and experience of the ordinary seamen, the vessel's procedures and communication on board.

3.2.1 Training and procedures

The workload was high in relation to the experience of the ordinary seamen

Ordinary seaman B was more experienced than ordinary seaman A and therefore had to take on the role of the more experienced able seaman during loading. Ordinary seaman B also helped ordinary seaman A with loading. When a problem arose during loading and the semitrailer truck needed to be reversed this added an additional duty that was rarely performed. This made the workload for ordinary seaman B high in relation to their experience.

In spite of the limited experience of working on board ordinary seaman A was given responsibility for the deck apprentice. This has probably contributed to an increased workload for ordinary seaman A, who had already been tasked with a new duty (that ordinary seaman B took over).

The high workload has probably resulted in the situational awareness of both ordinary seamen being impaired.

The ordinary seamen had formal qualifications but lacked experience

The ordinary seamen had both completed induction training and familiarisation training on the vessel. Both had also completed internship on board. They were formally qualified for the work of an ordinary seaman and to be part of the vessel's safety management system.

The duties that an ordinary seaman was to have command of were extensive. It has emerged during interviews that it took approximately six months for a newly employed ordinary seaman to gain command of all of the duties.

The company had produced checklists for a number of duties. However, the ordinary seamen had to learn the majority of the duties by working together with a more experienced crew member.

Loading and unloading of the vessel were carried out on a daily basis and both of the ordinary seamen had participated in this work, but only together with a more experienced able seaman. In spite of this, ordinary seaman A had not conducted loading towards the aft ramp in lane C and neither of them had themselves previously been responsible for reversing vehicles. Accordingly, they were tasked with duties which they did not have previous experience of but were expected to be able to perform without the assistance of more experienced crew.

Aside from the ordinary seamen there were four people working on the loading procedure. All of them had a lot of experience working on board. It has not been established why both of the ordinary seamen were posted to work together without support from one of the more experienced able seamen.

In summary, the company has not ensured that the ordinary seamen had the knowledge and support that was required in order to perform the duties in conjunction with loading in a safe manner.

The company's risk management

Loading is associated with substantial risks. In order to ensure that people who are working with high-risk work tasks do so in a safe manner, sufficient instructions have to be produced for this work. This is especially important if the duties are rarely performed. The scope for individual solutions decreases if these instructions are also set out in writing. The company had produced some instructions concerning loading. However, there were no instructions for how the crew was to ensure that the space behind a vehicle was clear in the event that a vehicle needed to reverse.

Loading had been identified in the company's systematic work environment management as a work task associated with substantial risks. A number of measures to prevent these risks had therefore been produced. Nevertheless, these measures did not deal with all situations that may arise in conjunction with loading. For example, there were no measures for ensuring that the risks associated with reversing vehicles were minimised. Consequently, the company should ensure that appropriate action is taken in order to manage the risks associated with loading and unloading.

The induction procedures should be strengthened

There were large variations in the training of new staff because large parts of the training took place through the transfer of knowledge verbally. This has contributed to a level of knowledge among new staff that is difficult to appraise.

In addition, there has not been sufficient support from written instructions in order to provide the crew with appropriate knowledge for especially high-risk work tasks such as how vehicles were to be reversed in a safe manner.

Consequently, the company should ensure that new crew members are given sufficient information about the duties for which they are expected to be responsible, as well as knowledge of the risks that may be present in conjunction with the work and how these risks can be avoided or minimised.

3.2.2 Communication and working language

There were no set procedures for the use of language on the vessel

During loading the cargo officer provided information in Swedish over the radio about how many semitrailer trucks were being loaded and in which lane they were to be loaded. It has not been possible to establish the extent to which ordinary seaman B was able to take in this information but the ordinary seaman's limited understanding of the Swedish language has probably contributed to the ordinary seaman not having understood all of the information. This has probably contributed to the ordinary seaman not having realised that additional semitrailer trucks were on their way when the ordinary seaman asked the driver to reverse the first semitrailer truck.

The ordinary seamen communicated with each other in English, which was their common language. Ordinary seaman B and the driver of the semitrailer truck communicated in Polish. This may have contributed to ordinary seaman A not realising that a problem had occurred during loading and that the semitrailer truck was not in its final position.

The use of various languages during loading has made communication between those involved more difficult. Consequently, they have had limited opportunities to understand each other's intentions and actions in conjunction with loading.

It is not uncommon for crew members with different nationalities and linguistic backgrounds to work together on the same vessel. The majority of the crew of HUCKLEBERRY FINN were Swedish-speaking and the rest of the crew had varying degrees of proficiency in Swedish.

Some information on the vessel was translated into English, for example the manual that described the safety management system and

instructions that were related to this. However, there were no set procedures relating to which language was to be used in various contexts. Because the vast majority of the crew were Swedish-speaking, Swedish was thus the dominant working language. Consequently, those who did not speak Swedish had to rely on other means by which to acquire information about the day-to-day work. This has meant that not all of the crew have been able to take in relevant information about the work. The company should therefore revise its procedures with respect to how instructions and other information are conveyed to all concerned parties on board.

The group dynamics in the team

The team consisted of four people, a very experienced cargo officer, ordinary seaman A, who had an upper secondary education, ordinary seaman B, who was studying at a maritime university, and a deck apprentice who was doing an internship during the third year at an upper secondary school for seafarers.

The plan was for the ordinary seamen to work together, despite both actually were undergoing training. Despite the fact that ordinary seaman B was helping ordinary seaman A, this was done without demonstrating at the same time how the task was to be performed. Nor did ordinary seaman A monitor the work and was instead busy with the deck apprentice.

In addition, the ordinary seamen had only previously worked together for a few days and had, when doing so, misunderstood each other on a number of occasions. Consequently, there were no plans for them to continue working together on the day after the accident.

It cannot be ruled out that the composition of the group and how it worked together have had an impact on the likelihood of them being able to perform their duties in a safe manner.

3.3 Raising of the alarm by the vessel

The crew had access to emergency numbers for the emergency services. These were documented in the emergency procedures on board and were there for all the ports at which the vessel called. However, the crew made the assessment that it was better for the terminal staff to call SOS Alarm because it was them that would have to receive and open the gates for the ambulance. That is why the terminal staff were asked to call SOS Alarm. This led to a delay in calling an ambulance and resulted in the terminal staff being unable to convey information about the casualty to SOS Alarm.

It is essential that the person who contacts the emergency services is in close proximity to the occurrence and has first-hand information about the accident. Otherwise there is a risk of the emergency call out being delayed; insufficient information may also make it difficult for the emergency operator to assess which rescue resources are needed in

order to deal with the occurrence. The company should ensure that the person who contacts external assistance is able to convey an up-to-date view of the situation.

3.4 Reporting and follow-up of accidents

In this investigation SHK has studied information that is not directly associated with the accident but which reflects the difficulties with language and clear instructions that have been present on board at the time of the accident.

When the crew gathered together on the vessel after the occurrence the conversation took place in Swedish and important information from the crew has therefore probably not emerged. Nor were there individual interviews about the occurrence with the crew members involved, which could have mitigated the language difficulties among the crew. In turn, this led to the company not obtaining a complete picture of what had caused the accident and therefore taking action that perhaps might not have been able to completely prevent a similar occurrence. The company also had no clear instructions about how an accident investigation is to be conducted.

The Swedish Transport Agency is responsible for conducting inspections following accidents that have occurred and for keeping statistics about all accidents that take place within maritime transport. It is important that they receive reports that are accurate and submitted on time in order to allow action to be taken. In this case, the Swedish Transport Agency received information about the occurrence through the Swedish Social Insurance Agency and received the accident report from the company only after having contacted the company, approximately two weeks after the occurrence. The explanation for the failure to submit a report is deemed to lie in the company's main manual, which describes how accidents are to be reported. The perception on board was that the accident only needed to be reported to the Social Insurance Agency. The company's main manual describes various processes for reporting 'marine accidents' and 'labour accidents'. SHK makes the assessment that the instructions are unclear and are easy to misunderstand, which may potentially explain the actions of the crew. The existence of internal instructions does not do away with the need to comply with regulations issued by the supervisory authority. According to these it is the master who is responsible for ensuring that the appropriate reporting takes place.

Both the shortcomings in terms of how the company's accident investigation was conducted and how reporting took place are rooted in unclear instructions and inadequate communication. Although this has not affected the occurrence, the shortcomings in this are suggestive of the same structural failings as the underlying causes of the accident, namely unclear instructions and inadequate communication. Consequently, the company should revise its written instructions concerning accident reporting and follow-up.

3.5 Supervision of the work environment

It is not uncommon for language to create communication difficulties on a vessel where many different people work in widely differing areas and have various nationalities. Daily routines, the learning of new tasks and emergency procedures must function. The safety aspect in particular is the primary reason why there is an explicit requirement for a common language for the safety management system.

Although the Work Environment Act does not impose an explicit requirement with regard to which working language is to be used, the requirements are equivalent to those which apply to the safety management system. Accordingly, the systematic work environment management has to be communicated in a language that everyone can understand.

The working language for the safety management system was changed from Swedish to English in 2018. This meant that all documentation was to be translated and that everyone on board was to have the ability to communicate in English.

It has emerged during interviews that the crew largely continued communicating in Swedish in their day-to-day work and in the systematic work environment management. Some examples of this were radio communication during loading, safety committee meetings and documentation concerning the systematic work environment management.

The safety committee raised an issue concerning language difficulties in 2022, and proposed that non-Swedish-speaking crew members should not be part of the safety organization. Accordingly, the language difficulties have persisted for a longer period. However, the Swedish Transport Agency has not had the opportunity to identify this because, as of 2022, they were no longer conducting any periodic surveys of the systematic work environment management on board. The Swedish Transport Agency has not issued any remarks relating to language difficulties after 2016.

Until 2021 the Swedish Transport Agency was conducting periodic surveys of the work environment as one component of supervision of seaworthiness, the MLC and the safety management system. After 2021 supervision of the MLC and the safety management system, along with the other convention certificates, was delegated to DNV. Supervision of the work environment as a homogeneous field was not delegated but DNV continued conducting periodic surveys of those parts of the work environment that were deemed to be included in the supervision linked to the MLC and the safety management system. Vessels with completely delegated supervision do not need to undergo seaworthiness surveys and the extent of the supervision of the systemic work environment management can be assumed to have decreased because the Swedish Transport Agency was no longer conducting periodic

surveys of the MLC or the seaworthiness of the vessel. In addition, the extent to which systematic work environment management is to be supervised has also not been clarified as a Swedish requirement in DMLC I or in instructions for recognised organisations.

The difficulty in respect of which language is being used for on-board communication has been noted by both the Swedish Transport Agency and the company itself. In this case, communication shortcomings have been a contributing factor in the cause of the accident. However, shortcomings have only been noted in conjunction with inspection of the safety management system and the implementation of tasks related to this.

All in all, it can be established that there is a risk that supervision of the working environment may be handled differently for vessels with delegated supervision as opposed to vessels where the Swedish Transport Agency still exercises supervision. This may entail a risk of the supervision not being equivalent. Consequently, SHK sees that there are grounds for the Swedish Transport Agency to investigate how equivalent supervision of the work environment can be ensured for vessels that have delegated supervision and for vessels on which the Swedish Transport Agency conducts periodic supervision. This investigation should include an assessment of what consequences the difference in how the work environment is supervised may have from the perspective of safety.

4. CONCLUSIONS

4.1 Findings

- a) The vessel was to be loaded in the Port of Trelleborg ahead of a voyage to Poland.
- b) It was expected that the vessel would be fully loaded.
- c) Working on the main deck were, aside from the cargo officer, two ordinary seamen and a deck apprentice who was there in order to observe.
- d) The cargo officer was distributing the vehicles.
- e) One ordinary seaman directed a semitrailer truck at the far end towards the aft ramp. The next semitrailer truck needed an electrical connection.
- f) When the second ordinary seaman was going to fetch an electrical cable, the first vehicle began reversing and the ordinary seaman was crushed between the semitrailer trucks.
- g) One of the ordinary seamen who were working with loading did not speak Swedish.
- h) The ordinary seamen had limited experience of the duties they were to perform.

- i) The ordinary seamen were working with vehicles in the same lane.
- j) The ordinary seaman did not communicate to the rest of the crew their intention to reverse the semitrailer truck.
- k) No check took place of whether the space behind the semitrailer truck was clear.
- l) The ordinary seamen were not able to see each other after the first semitrailer truck had stopped. The ordinary seamen did not communicate in another way during the work loading lane C.
- m) All communication concerning loading the vessel took place in Swedish.
- n) The vessel did not have written instructions for reversing vehicles.
- o) The systematic work environment management has been conducted in Swedish and has therefore not been understandable to those members of the crew who do not speak Swedish.

4.2 Causes/contributing factors

Deficiencies in the company's risk analysis and procedures have led to the semitrailer truck being reversed without it first having been ensured that the space behind the semitrailer truck was clear of obstructions.

Contributing factors have been that the ordinary seamen have had to work without the support of more experienced crew, in spite of the fact that they had limited experience of the duties. Shortcomings in terms of communication have also contributed to the crew not understanding each other's intentions in conjunction with the loading procedure.

Underlying causes were that:

- instructions concerning duties were communicated in Swedish, which has resulted in that part of the crew who did not speak Swedish not having received complete information about the loading work and the prerequisites for this,
- the company had not ensured that the crew had the knowledge required in order to perform their duties, and
- there were no established instructions for how vehicles were to be reversed on the cargo deck.

5. SAFETY RECOMMENDATIONS

TT-Line GmbH & Co. KG is recommended to:

- Ensure that appropriate action is taken for the purpose of managing and communicating risks identified as being present in conjunction with loading and unloading (see section 3.2). (*SHK 2023:11 R1*)
- Revise its procedures with respect to how instructions and other information are conveyed to all concerned parties on board (see section 3.2). (*SHK 2023:11 R2*)
- In the event of an emergency, ensure that the person who contacts external assistance is able to convey an up-to-date view of the emergency situation (see section 3.3). (*SHK 2023:11 R3*)

The Swedish Transport Agency is recommended to:

- Investigate how equivalent supervision of the work environment can be ensured for vessels that have delegated supervision and for vessels on which the Swedish Transport Agency conducts periodic supervision. This investigation should include an assessment of what consequences the difference in how the work environment is supervised may have from the perspective of safety. (*see section 3.5. (SHK 2023:11 R4)*)

The Swedish Accident Investigation Authority respectfully requests to receive, by **8 December 2023** at the latest, information regarding measures taken in response to the recommendations included in this report.

On behalf of the Swedish Accident Investigation Authority,

Kristina Börjevik Kovaniemi

Per Jakobsson