



DUTCH  
SAFETY BOARD

# Fall from height

Fatal accident on board Fortunagracht -  
16 February 2018



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*The Hague, July 2020*

*The reports of the Dutch Safety Board are public and available on [www.safetyboard.nl](http://www.safetyboard.nl).*

## **The Dutch Safety Board**

When accidents or disasters happen, the Dutch Safety Board investigates how it was possible for these to occur, with the aim of learning lessons for the future and, ultimately, improving safety in the Netherlands. The Safety Board is independent and is free to decide which incidents to investigate. In particular, it focuses on situations in which people's personal safety is dependent on third parties, such as the government or companies. In certain cases the Board is under an obligation to carry out an investigation. Its investigations do not address issues of blame or liability.

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N.B. This report is published in the Dutch and English language. If there is a difference in interpretation between the Dutch and English version, the Dutch version will prevail.

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# 1 INTRODUCTION

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On 16 February 2018, at around 13.45 hours<sup>1</sup>, a crew member on board the Dutch cargo vessel *Fortunagracht* entered the ship's hold to search for lashing equipment. During the search, the deckhand fell from a height of 12 metres through a door opening into the hold, suffering serious injuries. Later that day, the deckhand died as a result of those injuries.

On 15 February 2018, the *Fortunagracht* dropped anchor near the port of Puerto de Sucre in Venezuela, while waiting to load containers at the quayside. The crew prepared the ship for the loading work, while at anchor. The weather conditions were good, so the work could be carried out using the ship's cranes.

During preparation of the holds, it became clear that there was a shortage of lashing equipment, and the victim went in search of additional equipment. During this search, he entered a stairwell where the lighting was not switched on so the area was in almost complete darkness. To compensate for this the deckhand borrowed a torch from another crew member, so he would be able to see what he was doing.

Shortly afterwards, crew members working elsewhere in the stairwell heard a scream from the hold. When the lighting was switched on from the bridge, they found the severely injured deckhand on the floor of the hold.

After rendering first aid, the medical evacuation was initiated and the victim was disembarked onto a boat belonging to the Venezuelan port authority and taken to hospital, on shore. The deckhand died at the hospital as the result of internal injuries.

The accident has been classified as a very serious accident as defined in the Casualty Investigation Code of the International Maritime Organization (IMO) and Directive 2009/18/EC of the European Parliament and the Council. This means that the Netherlands, as the flag state, bears the obligation to ensure that an investigation is carried out. This obligation to carry out an investigation is also laid down in the Safety Board Decree. Due to the itinerary of the vessel, investigators from the Dutch Safety Board travelled two weeks after the accident to Palm Beach in the United States of America, where they went on board the *Fortunagracht* on 28 February 2018, to carry out their investigations.

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<sup>1</sup> All times in this report are local time, unless otherwise specified.

This report answers the following investigation questions:

1. What caused the deckhand's fall into the hold?
2. What safety management measures and work agreements were in place on board the vessel and were these adequate for limiting the falling hazard?
3. What lessons can be learned from this accident?

## 2 BACKGROUND INFORMATION

### *Ship and crew*

The Fortunagracht was built in 2012 by Jiangsu Changbo Shipyard Company Limited in Jingjiang, China. The ship was commissioned by Spliethoff's Bevrachtingskantoor B.V. in Amsterdam and is one of six ships internally designated at the shipping operator as the F-type. This type of vessel is equipped with three large deck cranes, each with a maximum safe work load (SWL)<sup>2</sup> of 80 metric tonnes (mt)<sup>3</sup>. The ship has a container carrying capacity of 658 TEU<sup>4</sup>.

At the time of the accident, the crew of the Fortunagracht consisted of fifteen crew members, of four different nationalities. The captain was an experienced officer who since 2012 has sailed as captain on various Spliethoff ships. Since 2017 he has sailed on ships of the F-type. At the moment of the accident, the captain had been on board the Fortunagracht for four months. The victim, a deckhand, was a Filipino national. Just like the captain, he too had been on board the Fortunagracht for four months. Previously, both had sailed together on various ships owned by the operator, and both knew each other well.

| Position            | Nationality |
|---------------------|-------------|
| Captain             | Russian     |
| First officer       | Estonian    |
| Second officer      | Filipino    |
| Third officer       | Russian     |
| Chief Engineer      | Russian     |
| Second Engineer     | Filipino    |
| Third Engineer      | Filipino    |
| Trainee Engineer    | Filipino    |
| Deckhand cook       | Filipino    |
| Bosun               | Filipino    |
| Deckhand 1          | Filipino    |
| Deckhand 2 (victim) | Filipino    |

<sup>2</sup> Safe Work Load (SWL): the maximum load that can safely be applied to a crane.

<sup>3</sup> Metric tonne (mt): European weight indication equal to 1,000 kilograms.

<sup>4</sup> TEU: Twenty foot Equivalent Unit, the designation for the dimension of a single twenty foot-long container.

| Position   | Nationality |
|------------|-------------|
| Deckhand 3 | Filipino    |
| Deckhand 4 | Filipino    |
| Wiper      | Filipino    |

### Hold and configuration

The Fortunagracht has two holds and is suitable for various cargo types. The holds can be divided up using pontoons that can be installed horizontally and vertically, to form eleven different horizontal and vertical compartments (see Figure 1).

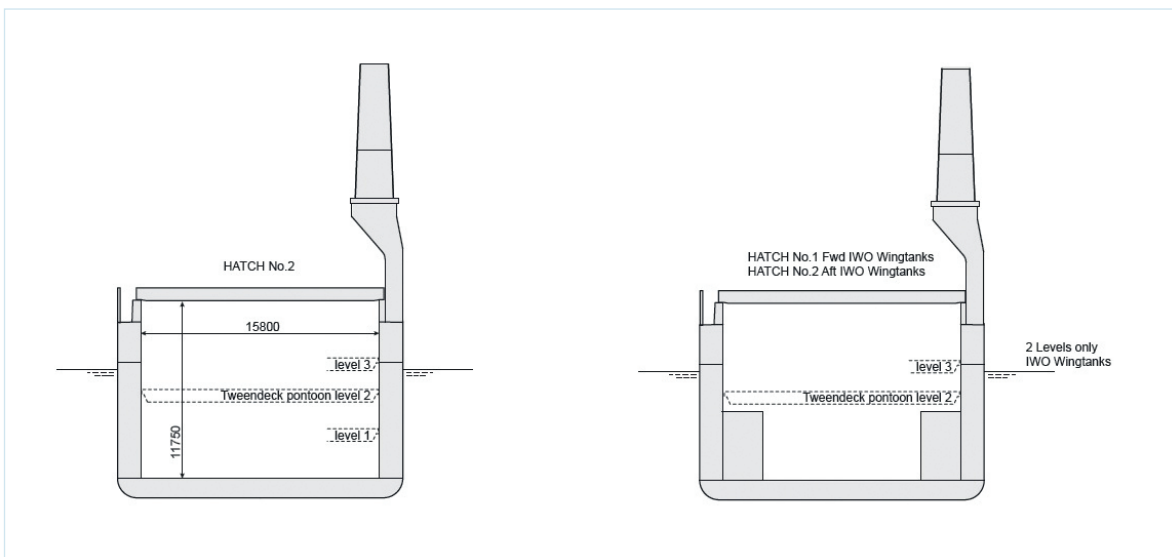


Figure 1: Various configuration options of the pontoons. (Source: Spliethoff)

As a result, various types of cargo can be carried on top of and adjacent to one another, thereby increasing the load-carrying capacity of the ship. A permanent bulkhead is fitted between hold 1 and hold 2 which houses the stairwell and access doors at the various possible deck levels (see Figure 2).

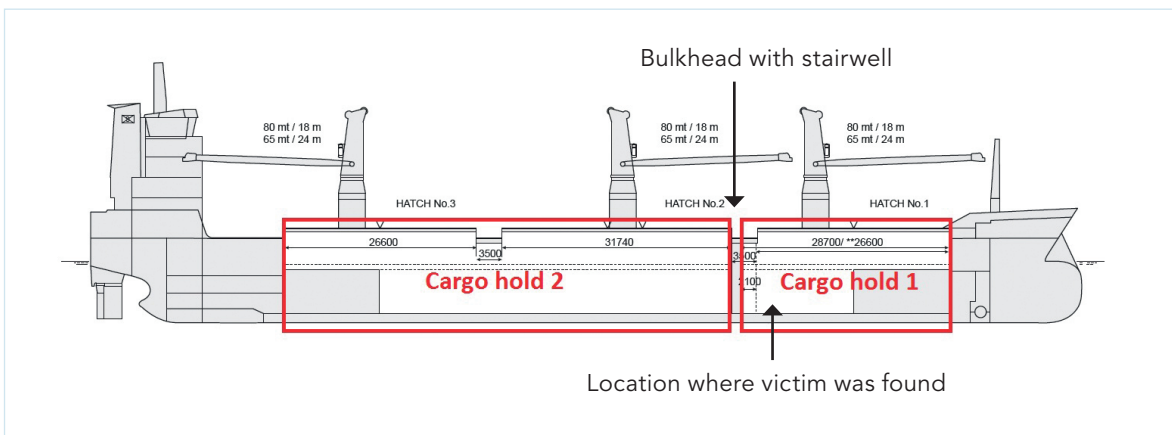


Figure 2: Hold layout on the Fortunagracht, showing the location where the victim was found (Source: Spliethoff)



## 3 COURSE OF EVENTS

### 3.1 Preparations in Hold 1 & 2

On 15 February 2018, the Fortunagracht was anchored off Puerto de Sucre in Venezuela (see the map below). The ship had to be prepared for loading one hundred 40-foot High Cube containers<sup>5</sup>.

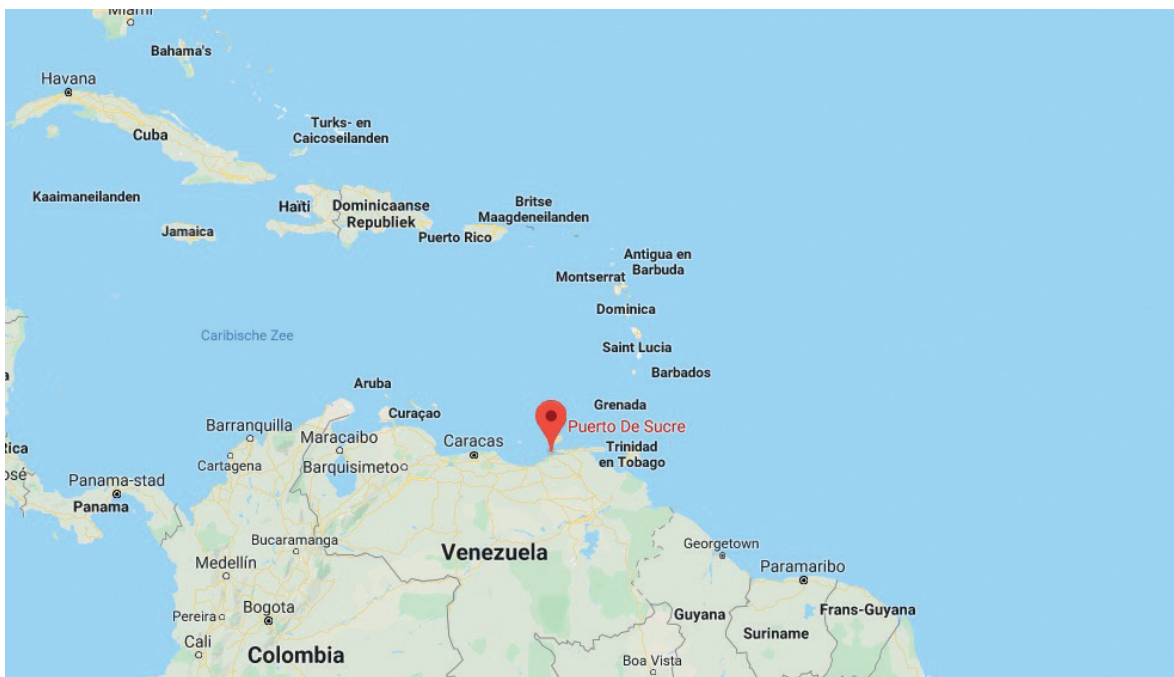


Figure 3: The location of Puerto de Sucre, Venezuela. (Source: Google Maps)

On 16 February 2018 between 08.00 hours and 12.00 hours, a team consisting of the bosun and a number of deckhands was at work in hold 1 moving pontoons from Bay 7-9 to Bay 5 (see Figure 4). During this work, the subsequent victim was operating the crane used to lift the pontoons. After the pontoons had been removed from hold 1 the hatches of hold 1 were closed. The team in question subsequently took a lunch break between 12.00 hours and 13.00 hours.

<sup>5</sup> 40-foot-long containers with additional height to provide greater than standard storage capacity.

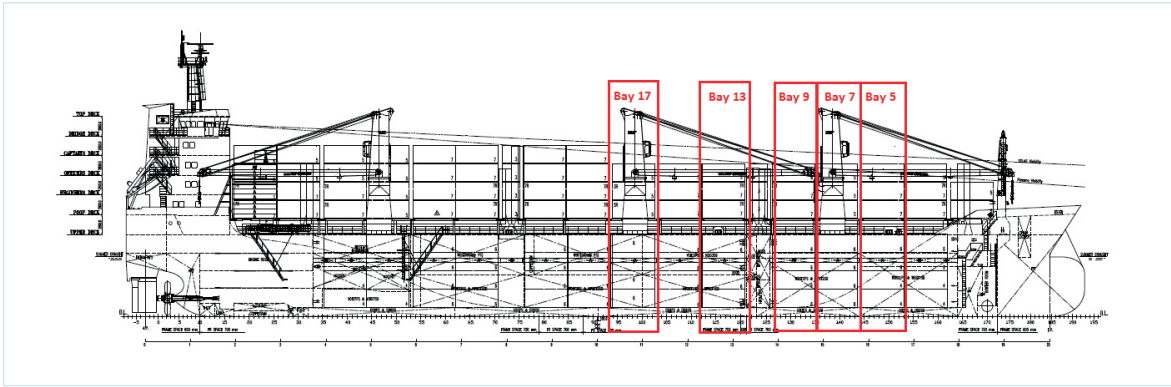


Figure 4: Bay 5, 7, 9, 13 and 17 on board the Fortunagracht. (Source: Spliethoff)

After lunch, the victim no longer operated the crane, but was set to work in hold 2 to stack pontoons in Bay 17 together with the bosun and another deckhand. At a certain point they discovered there were insufficient stacking cones, and the subsequent victim told his colleagues that he would look for additional stacking cones because he knew where several were located. He provided no further information about where the stacking cones were located.

**Stacking cones** (see Figure 5) are needed for loading the containers. Stacking cones are steel devices that fit precisely into the attachment points at the corners of a container (the corner castings) so that containers can be stacked without the risk of shifting. Stacking cones are generally used in the hold of a ship and not on deck. Stacking cones are also used for stacking pontoons in the hold of a ship in the store position, when the pontoons in question are not required.



Figure 5: Stacking cones.

### 3.2 The search for stacking cones and welding cables

While work in hold 2 was well underway, the third engineer and the trainee engineer were searching elsewhere on the ship for the welding cables they would later need for fixing the cargo. Earlier that day, the chief engineer had asked them to make sure that the welding cables would be available after lunch. While searching for the welding cables,

in the gangway on the starboard side of the ship, they encountered the deckhand (the subsequent victim) who was looking for the additional stacking cones. They asked him whether he had seen the welding cables they were looking for. The deckhand indicated that he had seen the welding cables in question in the stairwell between holds 1 and 2.

The three crew members walked towards the stairwell between holds 1 and 2. The third engineer and the trainee engineer entered first, followed several minutes later by the deckhand. It was dark in the stairwell, but the deckhand had indicated that the welding cables were located close to the entrance. The three crew members decided to use their torch and to not request the bridge to switch on the lighting in the hold and the stairwell. In addition, the hatch at the top of the stairs admitted some daylight, and according to them there was sufficient light to find the welding cables (see Figure 6).



*Figure 6: Stairwell where the welding cables were located, with the lighting on/off. These photographs were taken during the visit to the Fortunagracht, two weeks following the accident. On that occasion, the conditions were different from the conditions on the day of the accident. These photographs therefore provide only an indication of the difference between the situation with the lighting switched on and off.*

The Fortunagracht is equipped to transport various types of cargo, including the transport of hazardous substances and/or inflammable cargo. For the transport of hazardous substances, the Fortunagracht is certified according to SOLAS II-2/19.3.2 'Sources of ignition'. In accordance with these regulations, on these ships, as standard, the lighting in the holds must be switched off and can only be switched on/off from the bridge. The reason for this requirement is the sparking hazard that can occur when the lighting is switched on/off. It is the task of the Duty Officer on the bridge to assess whether the switching on or off of the lighting presents a hazard.

After they had found the welding cables, the deckhand asked whether he could borrow the third engineer's torch. The third engineer handed over his torch to the deckhand, without asking any further questions. While the two engineers were collecting the welding cables they needed, the deckhand descended further into the hold entrance to hold 1, with the torch. Based on the interviews held with the crew, it seems probable that he intended to look for the additional stacking cones he needed for the pontoons in hold 2.

The engineers continued collecting the cables and at around 13.45 hours, after they had found all the welding cables they needed, headed back up the stairs. They suddenly heard loud screaming from hold 1. According to his own statement,<sup>6</sup> the third engineer was panicked by the screaming and due to the lack of light decided to enter hold 1 via another entrance, to find out what was going on. The trainee engineer attempted to contact the bridge to ask whether the lighting in hold 1 could be switched on. Because he was unable to find anyone with a walkie-talkie, he ran to the telephone in the messroom. He called the bridge, where the ship's second officer answered. The second officer immediately switched on the lighting in hold 1 and the stairwell.



Figure 7: Comparable situation of the doors on the other side of the hold. The deckhand fell into the hold from a door opening at the height marked with the arrow.

6 Source: Crew interview.

### 3.3 Emergency response

With the assistance of a number of other crew members, the captain checked the victim for breathing, circulation and external injury and assessed the deckhand's injuries as critical. The captain had received extensive medical training and followed the protocol that was in place. Subsequently, the captain decided that the victim had to be stabilised, and that oxygen and medication needed to be administered and that he should be transferred as quickly as possible to a hospital, on shore.

At around 14.00 hours, the captain called the shipping company's local port agent<sup>7</sup>, to report the accident and to request assistance. The captain decided to contact the local agent because in his opinion this was the most effective course of action<sup>8</sup>. The shipping company's local agent made sure that a start was made on the medical evacuation of the deckhand. More than an hour later, at around 15.00 hours, a boat operated by the Venezuelan port authority came alongside the Fortunagracht. At around 15.35 hours, the stretcher carrying the deckhand was lifted on board the port authority boat by crane. Throughout this period the victim was conscious and responsive. Once on shore, the deckhand was transported to the local hospital.

At around 20.00 hours, a pilot's boat arrived to transfer the pilot to the Fortunagracht to guide the ship into port. At 20.30 hours the captain received a telephone call from the shipping company informing him that the deckhand had died in the hospital. The autopsy report indicated that the deckhand had suffered fatal internal injuries.

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<sup>7</sup> The local port agent is the representative of ship operators and service companies in port. His task is to undertake administrative duties and other formalities that have to be completed whenever a ship enters port. The port agent is not employed by the ship operator.

<sup>8</sup> Source: Interviews crewmembers.

## 4 ANALYSIS

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The analysis of this occurrence is focused on the direct causes of the accident on board the *Fortunagracht* and the underlying role and responsibilities of the ship manager (Spliethoff Bevrachtingskantoor B.V.). The emergency response by the local Venezuelan authorities and medical staff rendered after the victim was evacuated from the ship has not been further investigated.

The direct cause of the death of the deckhand was the fall from height into the hold, resulting in internal injuries. It is certain that the deckhand fell into the hold through one of the door openings behind which no tweendeck was present at the time. It is not possible to determine with certainty which door exactly and how he came to fall through one of these door openings. The statements and interviews were unable to clarify whether the doors in question were closed and locked<sup>9</sup>. It is certain that no warning or barrier had been applied to the door, clearly indicating that there was no tweendeck behind the door, with the resultant risk of falling.

### *No lighting in the hold and stairwell*

At the moment of the accident, it has been determined that the lighting in the hold was not switched on and that because the hatches were closed, hold 1 was in complete darkness. The lighting in the stairwell was also not switched on. Based on his experience, the victim was aware of the rules concerning lighting in the holds and stairwells on board the *Fortunagracht*. In addition, shortly beforehand, he and his colleagues had closed the hatch covers of the hold in question, after completing the work in hold 1. As a result, hold 1 was in complete darkness.

The lighting could only be switched on from the bridge, because with specific types of cargo, in connection with inflammability, it can be hazardous to switch the lighting on or off (sparking). The nature of the cargo is known on the bridge so that bridge crew are able to decide whether it is safe to switch the lighting on or off. In the framework of environmental policy, the standard situation on board is that the lighting in the holds is always switched off at times when no work is being carried out in the holds.

None of the persons involved was in possession of a walkie-talkie to communicate with the bridge. There are not sufficient walkie-talkies on board to continuously equip all crew members with a walkie-talkie. For each work order to be carried out, the officer responsible determines which crew members should be issued with a walkie-talkie. Via walkie-talkie, it is always possible to make direct contact with the Duty Officer on the bridge. In this case, such direct contact was therefore not possible. In addition, at the location on the ship where the work was being carried out, there was no telephone in the immediate vicinity.

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<sup>9</sup> During the interviews, there was conflicting information about whether or not the doors in question were closed and locked.

Based on the interviews with the third engineer and the trainee engineer, it is for this reason that the deckhand (the subsequent victim) decided to make use of a (borrowed) torch. According to the third engineer and the trainee engineer, the light entering from outside in combination with the torch was sufficient to find the welding cables, but for work further down the stairs and in the hold, in their opinion, this was not sufficient (see also figure 6).

In the Safe Working Manual of the *Fortunagracht*, an explicit explanation is given that stairs, steps and landings must be well lit. It is also specified that dark areas must be checked before leaving, and that doors must always be closed and locked. Interviews with various crew members revealed that it is not standard practice to enter an unlit compartment.



Figure 8: Door locking mechanism.

The Dutch Safety Board has been unable to determine whether the doors in the stairwell that give access to hold 1 were closed and locked after the tweendecks had been removed that morning. During the interviews held on board, contradictory information on these questions was provided by the interviewed crew members. It is however certain that no additional measures were taken to prevent entering a hold without tweendeck.

#### *Absence of pontoons was known*

That morning, the hold configuration had been altered, whereby the tweendecks were removed in hold 1, to make space for the containers due to be loaded in port. To carry out this work using the ship's crane, the hatches to hold 1 were first removed, so the hold

was illuminated by daylight. Following completion of the work, the result was a single large hold, over which the hatch covers above hold 1 were replaced, returning hold 1 to a state of complete darkness. The victim himself was directly involved with this work.

Based on the location where the victim was found in the hold, it was determined that the deckhand had stepped through a doorway, or fallen through the door opening, at a position where the tweendecks were no longer present.

*Other crew members failed to intervene*

The bosun and the fellow deckhand in hold 2 did not stop the victim when he left on his own to collect additional stacking cones. They did not ask to determine what he intended to do and/or to discuss the plan in advance.

Prior to carrying out any work, deckhands must discuss together the plan of action, and must report to the bosun and/or Duty Officer on the nature of the work to be carried out. A Last Minute Risk Assessment (LMRA) must then be carried out at the work location. In a case like this, the fact that the hold was empty should have been pointed out, together with the accompanying risks. A good LMRA would also have identified the fact that it is not desirable to work alone, and that unlit areas may never be entered, also not equipped with just a torch.

When the deckhand asked the third engineer whether he could borrow his torch, and did not explain what he intended to do with it, the two engineers did not ask any further questions. In the interviews, they stated that the experienced deckhand knew what he was doing, also given the fact that the deckhand was fully conversant with the situation in the stairwell.

In addition, no one commented about the fact that the deckhand was alone when he went in search of stacking cones and/or entered the hold. Spliethoff recommends against working alone on board all its ships, but this does not imply that every individual task must be carried out by two people. Ad-hoc activities carried out alone should be consulted with the bosun beforehand and reported to the Duty Officer. However, the interviews held on board revealed that it is common practice on board the Fortunagracht to work in pairs as far as possible.

The ship operator has stated that working alone on board its ships must be avoided as far as possible, and that in situations where this cannot be avoided, crew members working on deck must be equipped with a walkie-talkie. However, there are insufficient walkie-talkies on board the Fortunagracht to provide all crew members working on deck with their own walkie-talkie.

Interviews and observations during the investigation suggested that there was no culture on board the Fortunagracht according to which deckhands call each other to account for failing to comply with rules applicable on board. During the interviews held, a number of crew members stated that the culture among the majority of deckhands plays a contributory role. In this case, the victim was higher in rank and seniority.



### *Familiarization procedure*

In general terms, work in ship's hold and changes to cargo configurations always result in a risk to crew members. For that reason, it is essential that the objectives on board as laid down in the International Safety Management Code<sup>10</sup> for safe operation of ships (the ISM) are translated by the ship operator into procedures that are shared with the entire crew in the form of instruction and familiarization procedures. Instruction and familiarization procedures improve the situational awareness of crew members, with clear attention for specific rules and risks on board the ship. This increases knowledge of the ship and helps manage risks. The interviews held revealed that at the start of their period on board the *Fortunagracht*, every crew member receives instructions from the responsible officer about the special rules and regulations on board. The deckhand who lost his life in this accident had also received these instructions. Over the subsequent months, there were no indications that the deckhand in question was unaware of, did not understand or was violating applicable rules.

### *Spliethoff*

Spliethoff is one of the larger ship operators in the Netherlands. The operator is active in the field of specialist services such as dry cargo, breakbulk, container transport, Ro-Ro cargo and also yacht transport, for example. Spliethoff is ship manager of a large and modern fleet of more than 100 ships, ranging in size from 2,100 to 23,000 tonnes. For ships larger than 500GT, including the *Fortunagracht*, a Safety Management System (SMS) must be in place<sup>11</sup> that satisfies the standards laid down in the ISM code<sup>12</sup>.

The ISM code describes the requirements that must be satisfied by a Safety Management System (SMS). The code also describes the responsibilities on the company that manages the ship:

- The employer, in this case the ship manager, must formulate a safety policy.
- As part of that policy, the ship manager must guarantee the safe implementation of all ship operations and provide a safe working environment.
- The ship manager must also provide appropriate barriers for a number of the objectives specified in the ISM code.
- Moreover, the ship manager must ensure continuous improvement.

The captain of the ship is responsible for the implementation and execution of the safety policy imposed by the ship manager, on board his ship. He is also responsible for informing the ship manager of any shortcomings. The implementation and execution of the safety policy is assessed by the ship operator by means of internal audits undertaken on board the ships. In addition to internal audits, external audits are carried out by parties designated by government (see Shipping Act approved organization regulations).

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<sup>10</sup> The ISM code specifies objectives which the organization must implement, for example by drawing up procedures.

<sup>11</sup> Shipping Decree 2004, Article 49.

<sup>12</sup> ISM code: International Safety Management Code, adopted by the IMO Assembly in Resolution A.741(18), as amended by Resolutions MSC.104(73), MSC. 179(79), MSC. 195(80) and MSC.273(85). This Code has been made compulsory in Chapter IX of the annex to the 1974 SOLAS Convention, Management for the safe operation of ships.

The Fortunagracht is deployed for a wide range of different cargoes, such as container and dry bulk transport and for special transport operations (yachts, etc.). The investigation revealed the presence of a Safety Management System (SMS) sufficiently focused on the different operations for which the ship is used.

As a Dutch ship operator, a number of the officers employed by Spliethoff are Dutch nationals. However, it is not uncommon for no Dutch crew members to be present on Spliethoff ships, as was the case of the Fortunagracht at the time of the accident on 16 February 2018. For its officers' ranks, the operator often uses officers from Russia, Ukraine, Estonia and the Philippines. Junior officers and deckhands are mainly Filipino nationals. As far as possible, Spliethoff aims to take all crew members into service, as a means of guaranteeing familiarity with the ship, and experience.

All tasks in the ship's holds and changes to the cargo configuration can potentially generate risks for the crew members. It is therefore essential that all objectives that apply on board and that are formulated in the ISM code are not only translated by the ship manager into rules applicable on board, but that they are also regularly discussed and that compliance is monitored. If all these conditions are met, potentially dangerous activities will more often be identified and prevented.

#### *Internal and external audits*

Spliethoff operates a periodic timetable of annual, preannounced internal audits on board its entire fleet, in line with Part A, section 12.1 of the ISM code<sup>13</sup>. Wherever they are located in the world, the ships are visited by internal auditors from the operator; the auditors are employees of the QHSSE department. In principle, for logistic reasons, there are no unannounced audits.

External audits are also carried out by staff of approved organizations (better known as 'classification societies') on behalf of the Dutch flag state, the purpose of which includes checking whether the ship manager and the ship satisfy the statutory requirements imposed in the ISM code. These external audits can take place separately or be combined with the internal audits.

Subjects that are covered by these audits relate to the Safety Management Certificate (SMC) issued for the specific ship in question. The Fortunagracht was last audited prior to the occurrence of the accident on 16 February 2018 (in a combined internal and external audit process) on 29 & 30 March 2017 in Rauma, Finland. In addition to an internal auditor from the QHSSE department at Spliethoff, the audit was carried out by Lloyd's Register. During this audit, one of the subjects of the audit was 'ship familiarisation & training for officers and crews' and 'master and officers familiarity with the SMS'. Documentation on board and interviews about both these points revealed no shortcomings. The only recorded observation (shortcoming) during this audit bore no relation to the subsequent accident.

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<sup>13</sup> ISM code, part A, paragraph 2.1 The Company should carry out internal safety audits to verify whether safety and pollution prevention activities comply with the SMS.

### *Port State and Flag State Control inspections*

Ships are also regularly inspected by government bodies during so-called Port State (PSC) and Flag State (FSC) Control inspections. These take place over and above the annual inspections and audits and are carried out by approved bodies in the framework of a number of international conventions, in the Netherlands specified among others in the Shipping Act. Prior to the accident, the Fortunagracht had undergone a PSC inspection at the start of February 2018 (US), in November 2017 (US) and in September 2017 (Australia). No shortcomings were observed during these inspections. The last accident in which the ship was involved occurred in November 2012. This involved damage incurred during mooring.

### *Internal investigation by the operator*

Following the fatal accident on board the Fortunagracht, an internal investigation was launched by the operator. During the visit by the Dutch Safety Board to the Fortunagracht in Palm Beach (US), a member of staff of the QHSSE department was also on board the ship as part of that internal investigation.

Findings from the internal investigation were shared with the crews of the other ships that make up the fleet, in the form of a Safety Flash. A Safety Flash is sent out to all ships in the event of an urgent safety-related problem.

### **Safety Flash Fortunagracht accident**

*Recently an accident occurred on board one of our vessels, which regrettably resulted into the death of one of our colleagues.*

*Whilst at the anchorage, the crewmember was looking for stacking cones in a hold entrance, while the light in the hold and hold entrance was switched off. Using a small (pocket) flashlight he continued his search to the tweendeck.*

*However, the tweendeck pontons were removed a few hours earlier, and he fell from hold entrance to the tank top. While first aid was rendered quickly, and the victim was taken to hospital, he did not recover from his injuries.*

*Although currently some questions are still unanswered, and the official accident investigations (both by the company and Flag State authorities) are still ongoing we like to emphasize the following safety precautions:*

- Working on deck or in the hold should always be performed using ample lighting, illuminating the workplace sufficiently. Preferable by using (fixed) floodlights or TL, or using portable (large flash-) lights providing ample illumination. Consider carrying a backup flashlight, in case one may fail.*
- Avoid working alone in the holds or on deck. If working alone is unavoidable ensure a radio is carried at all times, to be able to call for help, if needed.*

*If investigations are completed, we will inform the fleet on the conclusions via publications in Safety Moments. For the moment, please share this message with all crew, and discuss same in next Safety Committee meeting.*

This Safety Flash fails to mention the absence of additional barriers for preventing a person stepping and/or falling through a door behind which there is no tweendeck present. This point was, however, discussed during an interview with the QHSSE department at Spliethoff in May 2018.

Finally, Spliethoff periodically publishes an in-house magazine *Safety Moments*, in which safety-related issues are discussed, such as the accident on the *Fortunagracht*. The accident was also the subject of specific discussion within Spliethoff's Safety Committee, and was considered during the annual officers' days organised by Spliethoff. All officers employed by Spliethoff are required to attend these days. The organization of officers' days is a broadly employed practice by Dutch operators and is also seen as a useful means of encouraging discussion of safety problems within the fleet. For junior officers and deckhands, Spliethoff organises Pre-departure Orientation Seminars at the company's offices in Manilla (Philippines). A regular feature of these seminars is potential safety issues on board the ships.

#### *Medical assistance*

With regard to the analysis of the medical assistance rendered, the Dutch Safety Board has based its conclusions primarily on the interview with the captain and a conversation with a doctor from the Radio Medical Service (RMD).

Following the occurrence of the accident, the crew responded rapidly. In assessing the injury to the deckhand, the captain made use of the medical protocol available on board (*The ship's captain medical guide*<sup>14</sup>). He examined the victim for vital functions and anticipated the possibility of spinal fractures. He based his assumptions on visible external injuries. In the event of a fall from height, internal injuries cannot be excluded, and this possibility was considered by the captain in assessing the condition of the deckhand<sup>15</sup>; nonetheless, no specific measures were taken. In the interview with the Dutch Safety Board, the captain indicated that his thinking on these questions was coloured by the fact that at that time the victim was still responsive. For that reason, the captain assumed 'external injury' of such severity that the victim had to be transferred to hospital as quickly as possible for further examination and treatment. On the basis of this case history, the captain started treatment of the victim, including stabilization and the administration of drugs and oxygen. The captain also opted to have the transfer of the victim to shore organised by the ship operator's local port agent in Venezuela. The port agent contacted the local authorities. The captain determined that contacting the Radio Medical Service for further medical advice and assistance was not necessary in speeding up the evacuation of the seriously injured crew member. The captain decided not to use the RMD as not to disrupt communication with local parties via the agent.

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14 Publisher Sdu. Internal publication Spliethoff Group in collaboration with G4S, an institute that organises medical training courses. The author is a special trauma nurse with extensive medical experience with the Defence organization and the ambulation service. The aim of the protocol is to provide a step-by-step plan for analysis and where necessary treatment, and may not be seen as a substitute for medical training or the medical guide.

15 Source: interviews crewmembers.

In the event of serious accidents or sickness on board a seagoing ship or yacht, anywhere in the world, the captain can contact a doctor of the **Radio Medical Service (RMD)** of the KNRM ship owners' organization, for medical advice. The doctors of the Radio Medical Service are available for emergencies, 24 hours a day. They run a normal general medical practice as well as working for the RMD. The GP in question is familiar with the maritime world, understands the workings of a ship and is able to prepare a case history remotely, based on symptoms described via radio or satellite. RMD doctors are masters at overcoming language barriers and are selected specifically according to these skills. Depending on the situation, the doctor can prescribe medication or recommend that the victim or patient be disembarked or transported to the nearest port. The GP of the RMD can also contact local authorities around the world via the Dutch Coastguard Joint Rescue Coordination Centre, thereby helping to ensure the fastest possible medical evacuation. Every year, Radio Medical Advice is issued in the Netherlands on more than 750 occasions.

On the *Fortunagracht*, of all the officers on board, the captain and first officer had received most medical training, but are no doctors. Based on this extensive medical training, they are able to assess injuries or sickness on board if the ship is at sea, and wherever possible to provide treatment. The other officers had received less extensive medical and healthcare training. In the event of a serious accident, such as a fall from height, it is always worthwhile to contact the RMD. In cases of this kind, the RMD would point out the risk of internal injuries and discuss potential treatments and/or medication aimed at limiting the consequences. The medical treatment of internal injuries on board a ship is highly complex, but the consequences can be delayed by appropriate treatment (for example the administration of oxygen and/or drugs)<sup>16</sup>. The RMD can also assist in the medical evacuation. The possibility of contacting the RMD is an integral part of any extensive medical training, and was certainly known to the captain.

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16 Source: consultation by telephone of RMD doctor by specialist investigator at the Dutch Safety Board.

## 5 CONCLUSIONS

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The direct cause of the death of the deckhand was the fall from height into the hold, resulting in internal injuries. The victim was 1) carrying out ad hoc tasks which were insufficiently discussed in advance with the bosun and were not reported to the Duty Officer, 2) was carrying out this work in the hold, while alone and 3) entered an unlit compartment, equipped only with a torch.

On ships with the possibility of adapting the deck configuration depending on the cargo to be carried, the situation must not be permitted to arise in which doors leading to the hold are not fully closed and locked prior to the removal of the decks (pontoons). This must be strictly supervised. The Safe Working Manual on board the Fortunagracht was sufficiently clear in specifying this requirement, but supervision of actual implementation proved insufficient.

Moreover, it emerged from the investigation that at the time of the accident on board the Fortunagracht, no additional barriers were available for preventing a person stepping and/or falling through a door behind which there was no tweendeck.

Even in situations in which crew members on a ship are offered sufficient opportunity for familiarisation and instruction aimed at informing them as fully as possible of the procedures on board, and ensuring sufficient familiarity with the ship, during day to day operations, it is still important to remain alert to the actions of others, and to call each other immediately to account if those actions are not in line with the safety agreements.

For Dutch flagged ships, remote assistance in the event of a medical emergency at sea is available via the Radio Medical Service (RMD). The additional information that the doctor can provide remotely, and the contribution the RMD can make to the rapid deployment of a medical evacuation can in many cases be of additional value.

## 6 RECOMMENDATIONS

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The Dutch Safety Board issues the following recommendations to the Spliethoff Bevrachtingskantoor B.V.:

1. As far as possible prevent crew members from working alone on deck, in the hold or in the engine room. If working alone is necessary, make the carrying of a walkie-talkie compulsory, and organise the personal issuing of walkie-talkies.
2. Communicate the lessons from this occurrence both within Spliethoff Bevrachtingskantoor as well as within the various business components of the Spliethoff Group, and with external industry parties:
  - Ensure a thorough (prior) discussion between all crew members of all planned or unplanned activities to be carried out on deck, in the engine room or in the hold. This includes both planned and unplanned activities and the compulsory carrying out of a Last Minute Risk Analysis (LMRA).
  - Inform the Duty Officer in advance, or in other cases the bosun, when unplanned work is carried out, including information about the assignment to be undertaken, the person(s) responsible for carrying out the work and the location on the ship.
  - Irrespective of rank or seniority, call each other directly to account for actions that are not in line with the safety agreements on board.
  - In the event of a serious accident at sea, always make use of the services of the Radio Medical Service (RMD).
3. Investigate whether additional safety barriers are possible that could further limit the risk of falling through doors behind which there is no tweendeck.
4. Monitor whether the lessons from this occurrence and the measures taken to prevent similar accidents on board are complied with.

## VESSEL DATA

| Vessel data                          | Fortunagracht  |
|--------------------------------------|--|
| Photograph:                          |  |
| Call letters:                        | PBUU   |
| IMO number:                          | 9507609  |
| Flag State:                          | The Netherlands  |
| Home port:                           | Amsterdam  |
| Type of ship:                        | General Cargo with Container Capacity  |
| Classification society:              | The Britannia Steam Ship Insurance Association Ltd.                                |
| Year of construction:                | 2012   |
| Shipyard:                            | Jiangsu Changbo Shipyard Company Ltd.  |
| Length overall (Loa):                | 137.07 m.  |
| Length between perpendiculars (LPP): | 127.14 m.  |
| Breadth:                             | 18.9 m.  |
| Actual draft:                        | 8.5 m.   |
| Gross Tonnage:                       | 8620   |
| Engines:                             | Wartsila 6L46 diesel   |
| Propulsion:                          | 1 propeller – 1 bow thruster   |
| Maximum propulsion capacity:         | 5847 kW  |
| Maximum speed:                       | 15.7 knots   |
| Vessel certificates:                 | All valid  |



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