



DUTCH
SAFETY BOARD

Collision on the Western Scheldt

River cruise ship Viking Idun and chemical
tanker Chemical Marketer, 1 April 2019



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Chemical Marketer, 1 April 2019

The Hague, December 2020

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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 languages. If there is a difference in interpretation between the Dutch and English version, the Dutch text will prevail.

Recommendations	6
1 Introduction	8
2 Course of events	10
2.1 The planned route of the vessels involved.....	10
2.2 Grounding of the Viking Idun prior to the collision.....	11
2.3 The traffic situation prior to the collision.....	12
2.4 The collision.....	14
2.5 The aftermath.....	15
2.6 In-depth study questions	16
3 Background information Viking River Cruises	17
3.1 River cruises in the Netherlands.....	17
3.2 Viking River Cruises	17
4 Analysis of the Grounding and Collision	23
4.1 Guaranteeing competences and permits of crew members.....	23
4.2 Departure of the Viking Idun from Antwerp	24
4.3 Complex navigation zone.....	25
4.4 Grounding in the Nauw van Bath.....	26
5 Legislation, regulations and supervision on the Western Scheldt	29
5.1 Western Scheldt Shipping Regulations	29
5.2 Working languages in the Scheldt area	30
5.3 Supervision of river cruise ships	31
6 The role of Rijkswaterstaat on the Western Scheldt	36
6.1 The role of mobile VTS-operators from Rijkswaterstaat as supervisory body	36
6.2 Traffic control centres and the authorities of VTS-operators	38
7 Conclusions	42
8 Recommendations	44

Appendix A. Vessel data Viking Idun	45
Appendix B. Responses to the draft report	47
Appendix C. Parties involved in shipping on the Western Scheldt	48
Appendix D. Crewing requirement and operation	50
Appendix E. Background information Chemical Marketer & Chemship.....	52

RECOMMENDATIONS

In the river cruise sector, additional attention is needed for safety, especially in the light of the growth experienced and the large number of passengers transported on these ships. This need is further enhanced because many of the passengers have restricted capacity to cope independently. Against that background, the Dutch Safety Board issues the following recommendations:

To Viking River Cruises and other operators active in the river cruise branche:

1. Ensure that during each journey by a river cruise ship, a fully qualified and competent nautical crew is present on the bridge.
 - a. Develop, implement and enforce a customized training programme for the nautical crews, with periodic skills testing.
 - b. In that process, specifically focus attention on command of (foreign) languages (including nautical English) and sufficient local knowledge of the proposed shipping routes.

To the Joint Nautical Authority, the Minister of Infrastructure and Water Management and the Flemish Minister of Mobility and Public Works.

2. Tighten up the authorization and competence requirements for nautical crews on river cruise ships within the Scheldt area, making use of the option of including additional provisions in the Western Scheldt Shipping Regulations to ensure safe passage by river cruise ships. Possible provisions relate to familiarity with the navigation zone and/or the obligation to take a pilot on board, if this knowledge is not present. Also investigate whether these measures can be secured internationally.

To the Minister of Infrastructure and Water Management:

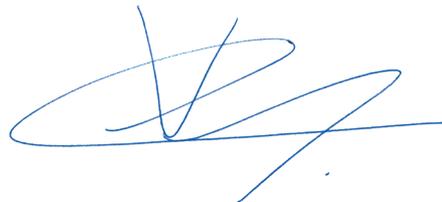
3. Improve the effectiveness of supervision on river cruise travel:
 - a. Develop a supervision arrangement for coordinated supervision of river cruise shipping.
 - b. Develop a set of tools for effective enforcement of the working language requirement.
 - c. On a structural basis, investigate accidents and incidents involving river cruise ships. Subsequently take action based on the lessons learned and share these lessons and findings with international partners.

Centraal Bureau voor de Rijn- en Binnenvaart (CBRB):

4. Share the findings and lessons learned from this investigation within your national and international network, including the Ledengroep Personenvervoer.



J.R.V.A. Dijsselbloem
Chairman Dutch Safety Board



C.A.J.F. Verheij
Secretary Director

1 INTRODUCTION

The occurrence

On 1 April 2019, shortly after midnight, a Swiss river cruise ship, the Viking Idun, collided with a Maltese chemical tanker, the Chemical Marketer, on the Western Scheldt, near the Put of Terneuzen. There were 171 passengers and 49 crew members on board the river cruise ship. There were 22 crew members on board the chemical tanker, which was laden with a cargo including benzene, heptane and methanol. A number of passengers on board the Viking Idun suffered minor injuries as a result of the collision, and the damage to both ships was considerable. Both ships were able to reach port following the collision, with tug assistance.

The river cruise ship Viking Idun was travelling from Antwerp to Ghent. The route took the vessel via the Western Scheldt and the Ghent-Terneuzen Canal. The Chemical Marketer was travelling from Iskenderun in Turkey to the port of Antwerp.

The focus of the investigation

Based on the damage suffered by the Chemical Marketer during the collision, this was a very serious accident as defined in the Casualty Investigation Code of the International Maritime Organization (IMO) and Directive 2009/18/EC (sea shipping). This means that if there are safety lessons to be learned, an investigation must be started. Unlike in sea shipping, for inland shipping there is no investigation obligation in Europe. This accident was potentially a very serious accident in which the passengers of the Viking Idun were dependent for their safety on third parties, and were entitled to assume that those third parties would guarantee their safety.

In the initial phase of the investigation, during which information was requested from various parties who deal with river cruise ships on a daily basis, questions were raised concerning the safety culture on board and supervision of safety on vessels of this kind. These included the competency of the nautical crews, as reflected in communication difficulties and violations of the sailing rules. It also became clear that this collision was not an isolated incident. The transport of large numbers of passengers, many of whom with restricted capacity to cope independently, on these river cruise ships therefore justifies a further investigation into this accident.

The basis for this investigation is therefore the investigation obligation applicable in sea shipping, although the investigation itself actually concentrates on safety of inland shipping and in particular the phenomenon river cruise ships. This report is not a thematic study into river cruise ships as a whole but, based on the collision between the Viking Idun and the Chemical Marketer and the earlier grounding of the Viking Idun in the Nauw van Bath, it does identify the safety problems from which lessons can be learned. The recommendations and conclusions from this investigation are expected to help improve safety in inland shipping in the broadest sense and in the operations of the rapidly expanding river cruise sector in the Netherlands.

The investigation was carried out on the basis of the following questions:

1. Which factors contributed to the occurrence of the accident?
2. What lessons can be learned from this accident in respect of the operation of river cruise ships and the process of supervision?

Further demarcation

The Western Scheldt is a complex tidal river in which both the Netherlands and Belgium play an important role. Extensive joint agreements have been reached concerning waterway management, use, pilotage, supervision, etc. Within the scope of this incident investigation, a number of aspects are identified which relate to the governance of the Western Scheldt. Nonetheless, these can only be viewed as a starting point for a possibly more far-reaching investigation on this subject.

Because both the grounding and the collision took place in Dutch waters, the role of the Dutch supervisory authorities is the central point of focus of this investigation.

Dutch regulations on inland shipping are to a large extent based on international legislation, and implemented (principally) in the Inland Navigation Act and the Shipping Traffic Act with their underlying regulations. These often also refer back to the CCR or EU legislation. Because national discrepancies between the relevant states in relation to these international regulations do not as a rule lead to safety problems, but far more to problems of an administrative nature, these issues are not discussed in depth in this investigation.

Justification of the investigation

For this investigation, the Dutch Safety Board held interviews with various actors involved in the occurrence. Discussions were for example held with the relevant crew members of the Viking Idun, representatives of Viking River Cruises in Wiebelsheim, Germany, with crew members on board the Chemical Marketer, the affected ship manager established in the Netherlands Chemship B.V., the Joint Nautical Authority (Gemeenschappelijke Nautische Autoriteit GNA), staff at Rijkswaterstaat including the VTS-operators at the Terneuzen traffic control centre and the mobile traffic controller, and a representative of the Nederlands Loodswezen Regio Scheldemonden (Dutch Pilotage Region River Scheldt). As part of this investigation, a series of documents were consulted relating among others to legislation and regulations, as well as documents on board the vessels and recordings of the radar images and sound recordings of the VHF marine radio of the Terneuzen traffic control centre. Based on the analysis of this investigation information, a determination was made as to whether and if yes, which safety barriers failed.

2 COURSE OF EVENTS

2.1 The planned route of the vessels involved

On 19 March 2019, the Maltese-flagged chemical tanker *Chemical Marketer*¹ set sail from Iskenderun (Turkey) for a journey to Hemiksem, near Antwerp (Belgium). On 31 March at 22.45 hours local time², a Dutch pilot came on board in the roads of Flushing, to guide the vessel along the Western Scheldt and the Scheldt rivers. On this route, a pilot is compulsory for seagoing vessels of this kind. On board the *Chemical Marketer*, there were no unusual circumstances and all systems were operating correctly. Besides the pilot, a helmsman and the third mate were present on the bridge. In total, there were 22 crew members on board.

On 27 March 2019 the Swiss river cruise ship *Viking Idun* had set sail from Amsterdam for a 10-day Tulips and Windmills cruise. There were 171 passengers and 49 crew members on board. On 31 March 2019 at 20.00 hours, the ship set sail from Antwerp, heading for Ghent. The *Viking Idun* intended to sail via the Scheldt and the Western Scheldt, through the locks at Terneuzen and the Ghent-Terneuzen Canal, and was due to arrive in Ghent on 1 April between 06.00 and 07.00 hours. The majority of this journey was due to be completed in the dark.³

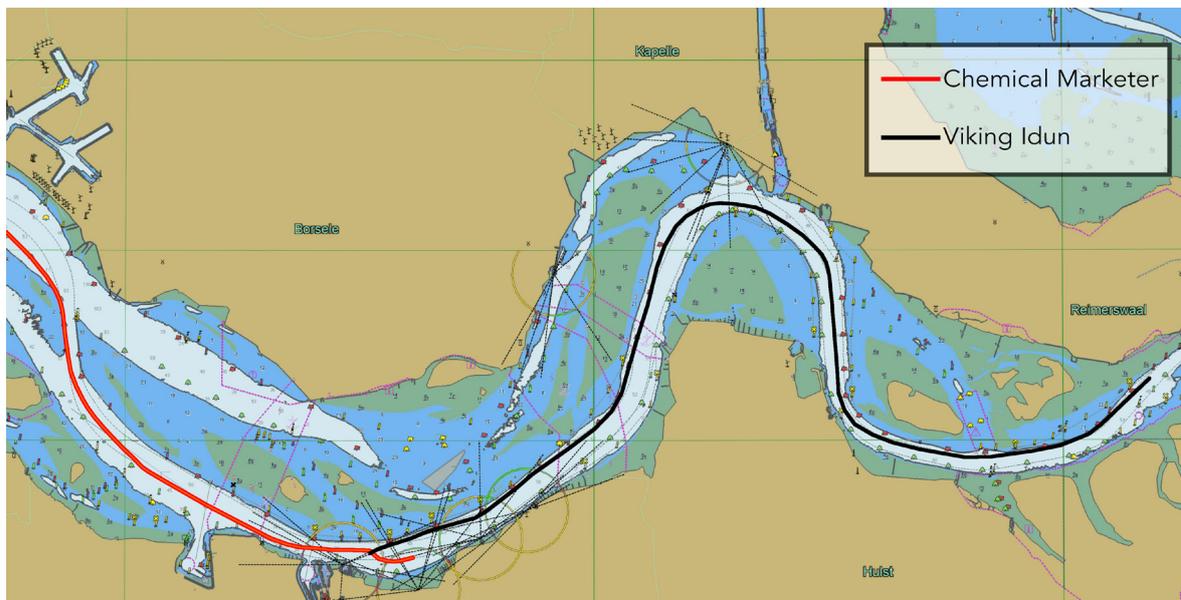


Figure 1: Shipping routes of the *Chemical Marketer* (orange) and the *Viking Idun* (black).

- 1 Background information concerning the *Chemical Marketer* appears in Appendix E.
- 2 All times in this report are local time.
- 3 Sunset in Antwerp on 31-03-2019: 20.13 hours. Sunrise in Ghent on 01-04-2019: 07.22 hours.

2.2 Grounding of the Viking Idun prior to the collision

Following departure from Antwerp, at around 21.45 hours, in the Nauw van Bath, the Viking Idun was overtaken by the Morning Calm, a Bahamian-flagged car carrier, with a length of more than two hundred metres. This manoeuvre was carried out at the request of the pilot on board the Morning Calm. In order to make sufficient room for this vessel in the narrow channel, the Viking Idun maintained its course as far as possible towards the starboard side of the channel, but close to buoy 66B left the navigation channel and subsequently ran aground (see figure 2).

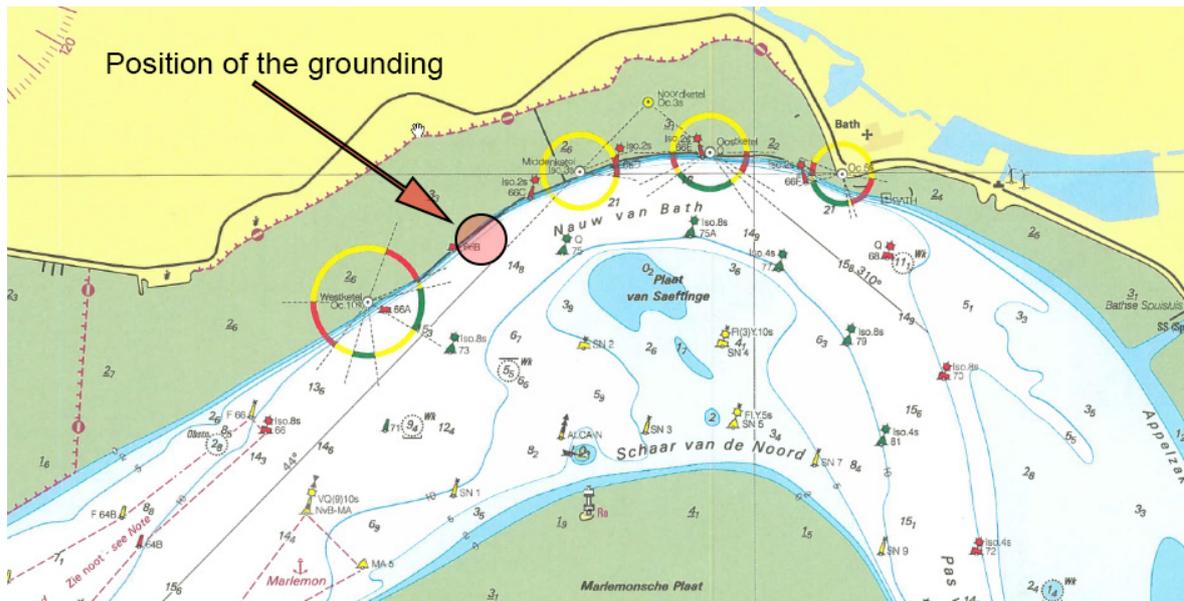


Figure 2: Extract from the sea chart marking the location of the grounding in the Nauw van Bath. (Source: Map 1803.4 "Western Scheldt. Walsoorden to Bath", Hydrographic Service)

The Viking Idun did not itself report the grounding to the traffic control centre; instead, the pilot on board the passing vessel reported to the traffic control centre that the river cruise ship should be carefully monitored, since it seemed to be experiencing difficulties. The traffic controller at the Belgian traffic control centre Zandvliet then asked the captain of the Viking Idun whether the ship required assistance. The captain of the river cruise ship issued a negative reply. After 25 minutes, the Viking Idun was able to refloat itself, and continued its journey towards Terneuzen.

In response to the grounding in the Nauw van Bath, the mobile traffic controller⁴ of Rijkswaterstaat on board the patrol vessel RWS79 was instructed by the Joint Nautical Authority (GNA) to approach the Viking Idun to assess the situation on the ground. Because the mobile traffic controller as a rule boards the vessel to be inspected alone, for capacity reasons, he usually selects one or two specific points on which to focus his inspection on board. In this case, the mobile traffic controller decided to call the crew to account for failing to report the grounding in the Nauw van Bath according to the relevant

⁴ The mobile traffic controllers from Rijkswaterstaat operate from RWS patrol vessels. In addition to the other crew members, a mobile traffic controller is present on these patrol vessels. Their tasks include supplying information, inspecting navigation channels and vessels (nautical enforcement), providing guidance and responding to incidents (see also section 6.1).

procedure, and to check whether one of the compulsory working languages (Dutch or English) was spoken on board. He therefore did not consider the possibility of underwater damage caused to the ship by the grounding. At around 23.00 hours, the mobile traffic controller from the RWS79 went aboard the Viking Idun, and encountered two people on the bridge. He observed that one of them was able to inform him in reasonably intelligible English that he was captain of the ship. He was also able to explain what had happened near buoy 66B in the Nauw van Bath. The mobile traffic controller issued a warning for the vessel's failure to report the grounding according to the relevant procedure and, seeing no further grounds to act on the captain's communication skills, he then disembarked. The RWS79 continued its patrol along the Western Scheldt, in the direction of Terneuzen.

2.3 The traffic situation prior to the collision

At 23.28 hours, the captain of the Viking Idun reported his presence to the traffic control centre Terneuzen, on VHF block channel 03. This is a compulsory report on the traffic channel according to the applicable VHF marine radio block channel procedure. The Viking Idun reported passing red buoy no. 32 en route for the lock in Terneuzen. The Terneuzen traffic control centre acknowledged this call.

The Viking Idun continued its journey towards the Eastern lock in Terneuzen. In the meantime, the Chemical Marketer was sailing towards Antwerp.⁵ At that time, both vessels were within the supervision area of the Terneuzen traffic control centre. At 23.55 hours, the pilot on board the Chemical Marketer contacted Terneuzen traffic control centre to ask whether the Viking Idun was intending to enter the Eastern lock at Terneuzen. This was confirmed by the traffic control centre. In response, the pilot suggested to the traffic control centre that the Chemical Marketer should maintain its course on the red side (the port side as seen from the Chemical Marketer) of the fairway, so that the Viking Idun could pass in front of the Chemical Marketer, and in that way cross the navigation channel. This would mean the vessels would pass green-on-green (see figure 3).

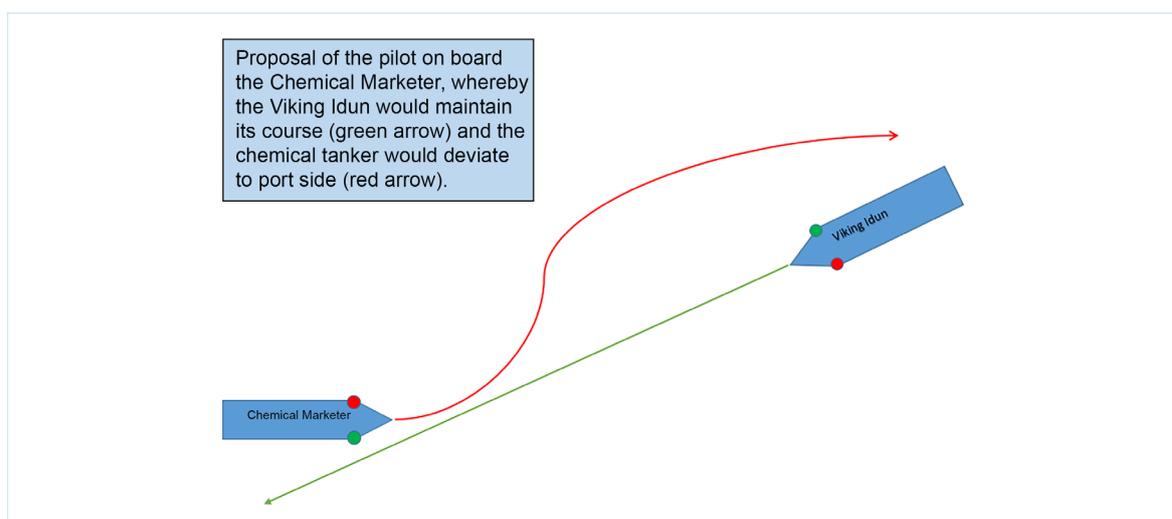


Figure 3: Schematic presentation of the green-on-green proposal from the pilot.

⁵ At that time there was a tidal current of approximately 1.5 knots.

The traffic controller rejected this proposal. He stated that the standard shipping rules had to be followed, whereby the vessels would pass each other red-to-red, and the Viking Idun would subsequently pass behind the Chemical Marketer (see figure 4).

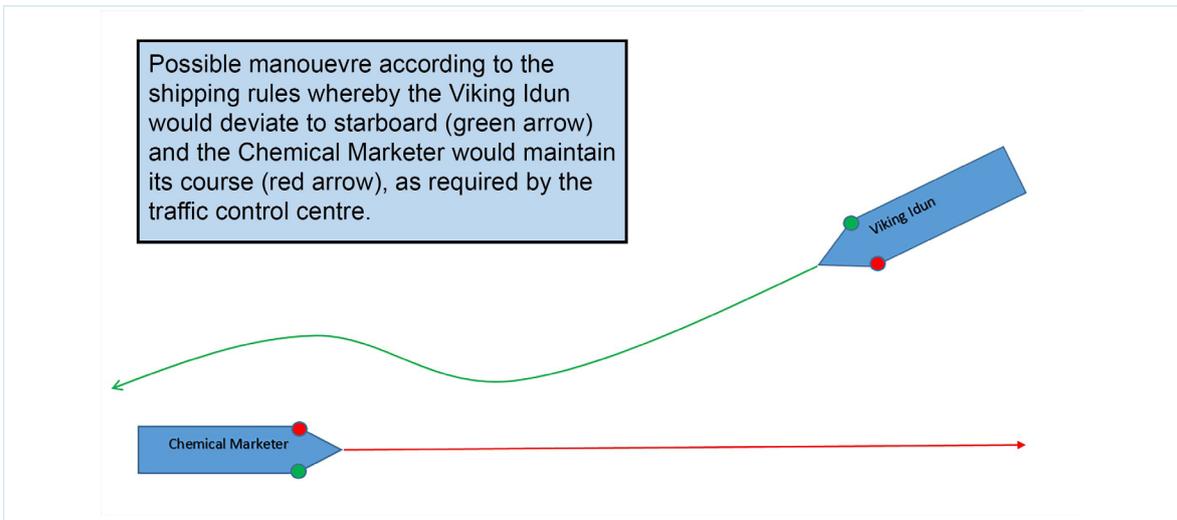


Figure 4: Schematic presentation of the standard avoidance manoeuvre.

Upon passing red buoy 22 at 23.56 hours, the Viking Idun once again reported to the Terneuzen traffic control centre. The traffic control centre informed the Viking Idun that there were three vessels departing from the Oost Buitenhaven, destined for Flushing. These vessels are shown in figure 5, in the Oost Buitenhaven. The traffic controller did not name the Chemical Marketer because at that time the Chemical Marketer had already passed the Oost Buitenhaven, and was in its judgement no longer relevant for the Viking Idun. The Viking Idun maintained its course and sailed towards the lock (see figure 5). The VTS operator offered no further advice to the captain of the Viking Idun about the ideal course for the entry to the lock in Terneuzen.

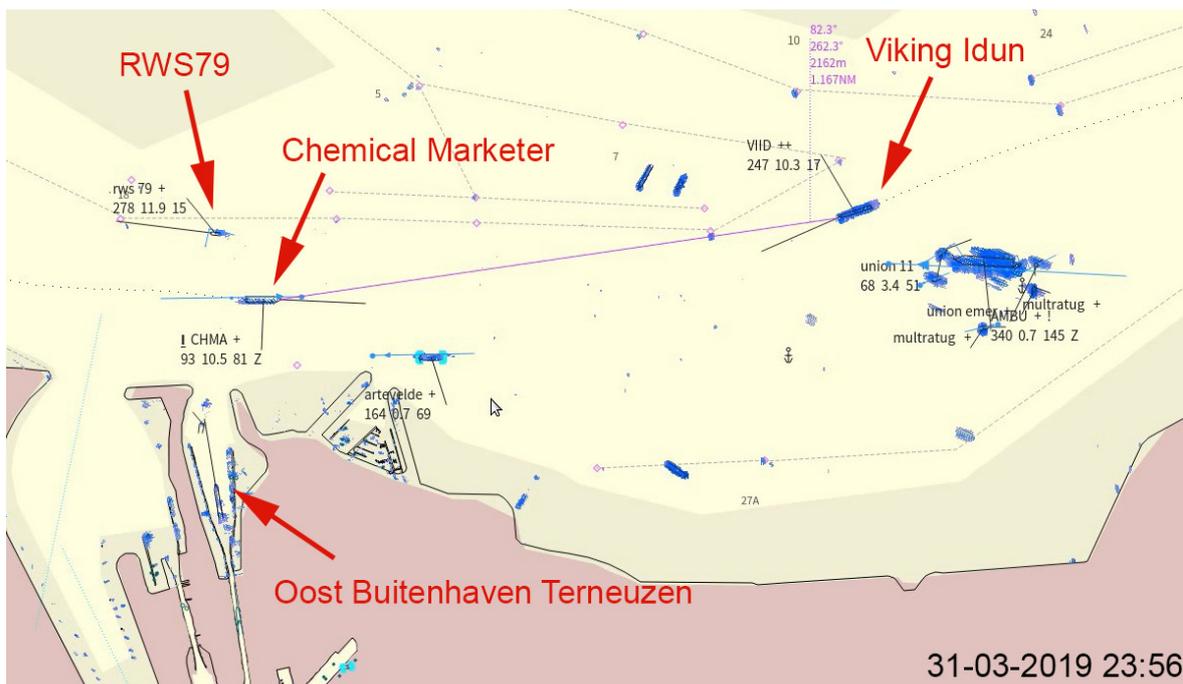


Figure 5: Screenshot of the radar image at Terneuzen VTS centre at 23.56 hours on 31 March 2019. For the purpose of visibility, the colours have been adjusted. (Source: RWS Scheldt Coordination Centre).

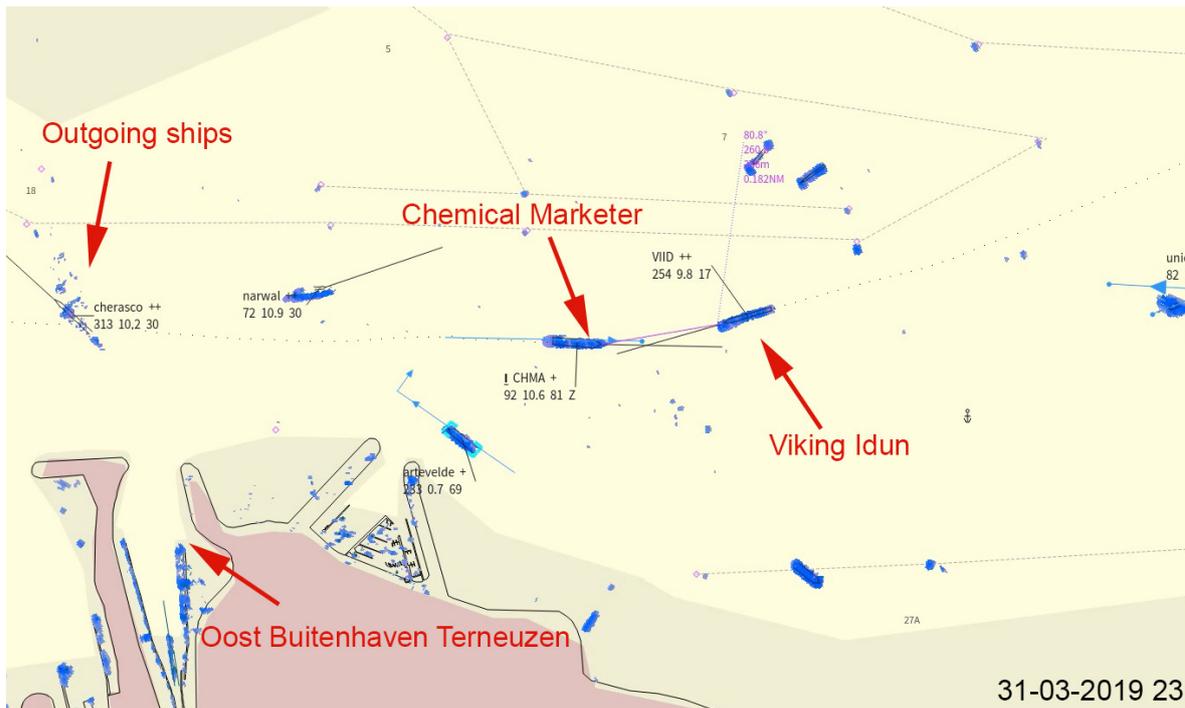


Figure 6: Situation at 23.59.30s. (Source: RWS Scheldt Coordination Centre)

2.4 The collision

At 23.58 hours, the pilot on board the *Chemical Marketer* called the *Viking Idun* via the traffic channel, to request confirmation of the red-to-red passage. The *Viking Idun* failed to respond to the pilot's call, and maintained its course towards the lock, instead of turning to starboard, to make room for the chemical tanker and sticking to the starboard side of the channel. The Terneuzen traffic control centre then called the river cruise ship; the vessel did reply to this call. The traffic controller explained that the plan was a red-to-red passage of the ship heading in the opposite direction, referring to the *Chemical Marketer*. The captain of the *Viking Idun* replied that he had not understood, and asked for the message to be repeated. The traffic control centre repeated the red-to-red passage rule, at which point the captain of the *Viking Idun* replied affirmatively. However, the *Viking Idun* failed to change course (see figure 6).

In the meantime, the *Chemical Marketer* had also continued on the same course, at the same speed, and the two vessels were approaching each other rapidly. At 23.59.35, the pilot issued a warning via the VHF marine radio that the situation was at risk of going wrong, and shortly afterwards ordered the helmsman to turn hard starboard, to ensure that the larger seagoing vessel would not hit the river cruise ship amidships thereby as far as possible avoiding damage to the river cruise ship. In the meantime, the traffic control centre called upon the *Viking Idun* on two occasions to turn to starboard, but without further reaction. At 00.00.08s on 1 April 2019, the pilot announced via the VHF marine radio that a collision had taken place. The *Viking Idun* had collided with the *Chemical Marketer* on the port side, just astern of the forec⁶ (see figure 8).

⁶ The forec⁶ of the ship is the front (raised) section where anchor and mooring gear are generally kept.



Figure 7: The damage to the bow of the Viking Idun, photographed in dry dock.

2.5 The aftermath

Both vessels suffered severe damage. On board the Viking Idun, a number of passengers suffered minor injuries. One crew member of the Viking Idun's hotel service was subsequently transported to a local hospital for medical examination. The Viking Idun suffered damage to the bow (see figure 7) and was towed to the West Buitenhaven of Terneuzen by tugboats. Later that night, the Viking Idun was guided through Terneuzen's Western lock, and berthed at the Goese Kade.

The Chemical Marketer suffered a tear of more than eight metres in length in the ship's skin, one metre above the waterline (see figure 8), but there was no spillage of cargo or other liquids from the vessel's double-walled tanks. However, because of the tear in the ship's skin, the vessel was no longer seaworthy. The vessel was anchored at mooring A in the Put van Terneuzen, to the southeast of the accident site, and was subsequently transferred with permission from the Human Environment and Transport Inspectorate (ILT) so that the cargo could be discharged and the damage repaired.



Figure 8: The damage to the Chemical Marketer following the collision with the Viking Idun.

2.6 In-depth study questions

The grounding of the Viking Idun in the Nauw van Bath and the traffic situation around Terneuzen which eventually resulted in the collision led the Dutch Safety Board to specify the following questions:

1. What underlying factors on board the Viking Idun contributed to the collision?
2. How did Viking River Cruises guarantee that the nautical crew members were in possession of the relevant competences and permits to sail in Dutch waters?
3. How do the Dutch authorities supervise compliance with the regulations regarding nautical crew members on board international river cruise ships?

3 BACKGROUND INFORMATION VIKING RIVER CRUISES

3.1 River cruises in the Netherlands

Over the past few years, the popularity of river cruises in Europe, and in the Netherlands, has grown hugely. In 2017, 407,000 tourists visited the city of Amsterdam, as part of a river cruise, a number comparable to the total number of tourists that visit the city as part of an ocean or sea cruise. The number of river cruise ships sailing in the Netherlands has risen from around 50 in 1990 to several hundred planned cruises in 2019-2020.⁷ The busiest month of the year is generally April, when the Keukenhof gardens are a huge tourist attraction, and special cruises are organized for that specific purpose.

In the period prior to 2020, the huge demand for river cruises had meant that finding personnel for these vessels had become difficult. As a result, increasing numbers of personnel from Eastern Europe and Asia were taken on, many of whom have a limited command of the working languages employed in inland shipping in Western Europe.

3.2 Viking River Cruises

Viking River Cruises organizes river cruises in Europe, Egypt and Asia, and operates more than 70 river cruise ships on the inland waterways of Europe. The number of river cruise ships operated by Viking has risen steadily. In March 2019, six new ships were christened and one year later, in March 2020, a further four new ships were handed over at the yard in Warnemunde (Germany). In addition to its river cruise division, a separate division at Viking organizes ocean cruises. This division of Viking operates independently from the river cruises.

The head offices of Viking River Cruises are located in Basel, Switzerland. The operational/technical department, including a number of parts stores, is based in Wiebelsheim, Germany. The nautical staff of Viking River Cruises represent more than thirty nationalities, and many of them come from Eastern Europe.

⁷ As a result of the worldwide COVID-19 pandemic, river cruise sailings in the Netherlands during the first half of 2020 stagnated almost entirely. At present it is unclear whether and when the numbers from the period 2017-2019 will once again be achieved.

The sale of cruise travel is mainly carried out from the sales office in Los Angeles, the United States, with smaller sales offices in London, the United Kingdom and in Sydney, Australia. More than 85% of river cruises by Viking are sold in the United States.

3.2.1 Viking Longships

The majority of river cruise ships operated by Viking in Europe, including the Viking Idun, are of the type Viking Longship. The main feature of these ships is the large glass windows from floor to ceiling on the port and starboard side, and a bridge positioned approximately one third of the ship's length from the bow.

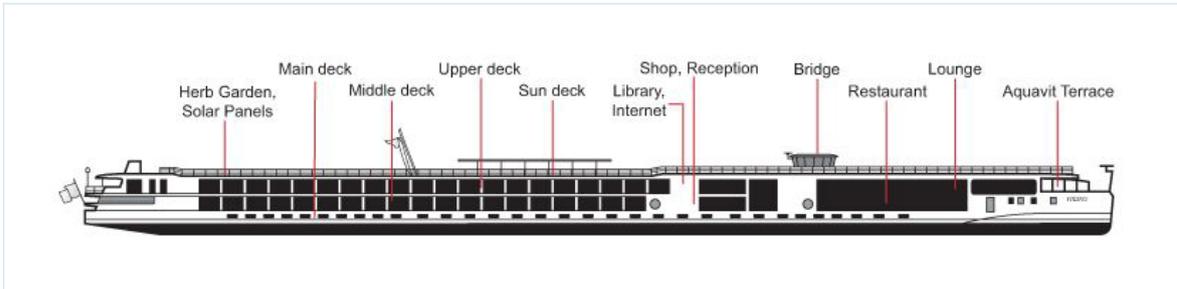


Figure 9: Viking Longship side view. (Source: www.vikingrivercruises.co.uk, consulted on 13 August 2019).

The Viking Idun has 95 passenger cabins of varying sizes, spread across three decks. The lowest deck, the main deck, is partly below the waterline, and therefore has smaller windows. The cabins for the crew members are also located on this deck. The middle and upper decks have large glass windows. The sundeck is primarily an open terrace area. The bridge is also located on this deck (see figures 9 and 10).

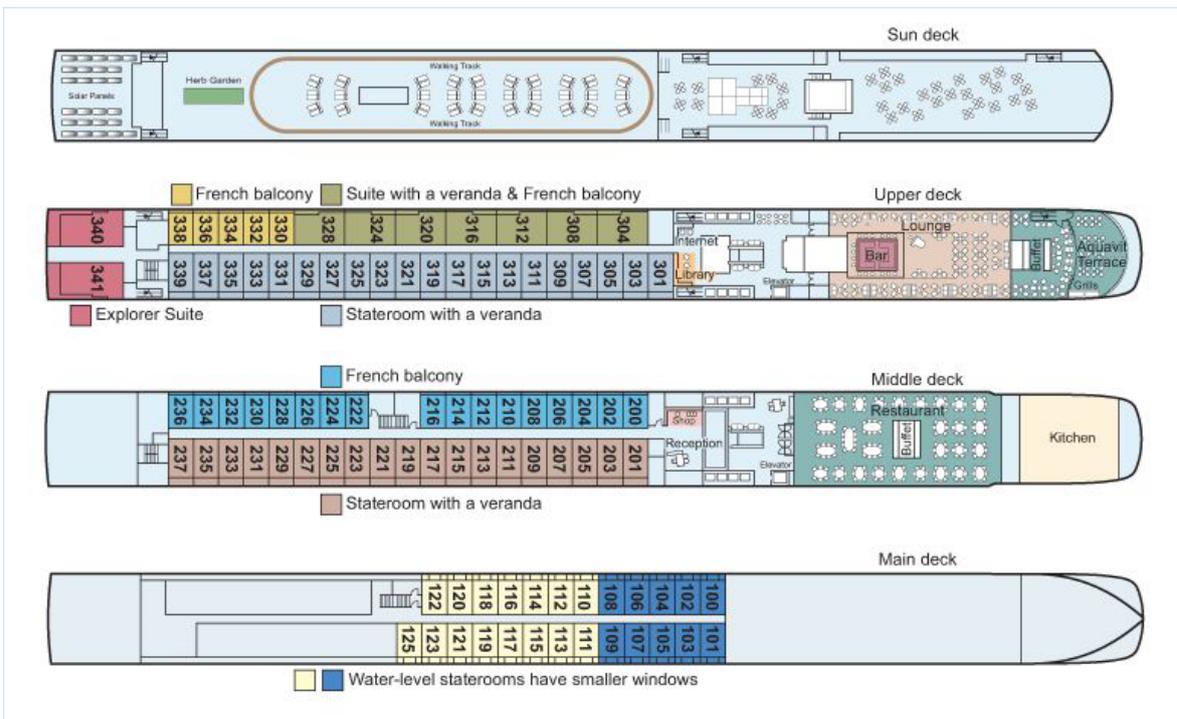


Figure 10: Decks and cabin layout on board the Viking Longships. (Source: www.vikingrivercruises.co.uk consulted on 13 August 2019)

3.2.2 'Tulips and Windmills' cruise

In the spring of 2019, seven to nine additional Viking ships were deployed in the Netherlands and Belgium, among others for the so-called *Tulips and Windmills* cruises (see figure 11). Demand for these seasonal cruises in the Netherlands and Belgium was particularly high from the United States / Canada and the Asian countries. The additional ships required for these cruises were available because the Main-Danube canal is closed during the early months of the year. As a result of this annual closure, the cruises from Amsterdam to Budapest and Budapest to Amsterdam cannot be organized. In other words, there are more ships available for cruises in the Netherlands and Belgium, in the spring months, so that the situation in Dutch waters is particularly busy. As well as making the necessary ships available for the *Tulips and Windmills* cruises, Viking River Cruises also has to ensure the availability of sufficient nautical crew members with the necessary knowledge and competences for sailing on Dutch waters.



Figure 11: Tulips and Windmills route map. (Source: <https://www.vikingrivercruises.co.uk>, consulted on 5 August 2019)

The *Tulips and Windmills* cruise starts in Amsterdam. The ships then visit Hoorn, Arnhem, Kinderdijk, Rotterdam, Antwerp and Ghent, before returning to Amsterdam. As much as possible the ship sails at night, to allow the passengers to disembark for daytime excursions.

3.2.3 Management of nautical staff

In the operational practice for the nautical department of Viking River Cruises, a series of corporate captains are employed. All these captains have considerable experience, but operate and coordinate mainly from shore. They are responsible for crewing, planning and crew certificates on the ships. They plan and pass decisions on the nautical crewing of the river cruise ships, based on current legislation in the destination areas of the various cruises.

The corporate captains are also required to check the crew certificates and maintain records of whether crew members have been active on the same route, in the past two or three years. If necessary, they arrange retraining or in-service training, on time. The same conditions apply to maintaining the validity of medical certificates.

As soon as the corporate captains determine that a crew member is not qualified or not competent, on the basis of notifications or during inspections, or if they are informed of operational problems, they are responsible for adjusting the crew of the ship, or are authorized to order a captain to make use of a pilot, for a specific part of the route. It is in theory also possible for a corporate captain himself to go on board a ship on which the crew is not sufficiently qualified or authorized for part of the route.

In addition, all nautical crew members of Viking River Cruises undergo simulator training each year, at a specialist simulation company in the Netherlands. During simulator training, particular attention is paid to responding to incidents, while consideration is also given to communication in English.

3.2.4 The crew of the Viking Idun

The crew of the Viking Idun consisted of 49 people, of whom 7 bore primary responsibility for the nautical aspects of the ship's operation.

Position on board Viking River Cruises	Rank (journey Viking Idun)	Rank according to Inland Navigation regulations	Nationality	Number
Captain	Captain	Master	Serbia	1
First mate	Captain	Master	Ukraine	1
First mate	First officer	Master	Bulgaria	1
Seaman	Second mate	Seaman	Croatia	1
Engineer	Engineer	Engineer	Hungary	1
Seaman	Seaman	Seaman	Rumania	2

Table 1: Crew composition of the nautical crew of the Viking Idun

The decision has been taken in this report to use the names for positions and ranks employed by Viking River Cruises. These deviate from the names used for crew members in inland shipping in the Inland Navigation Regulations (Bvr). These differences are clarified in table 2.

Two of the crew members on board the Viking Idun bore the rank captain. The captain with Serbian nationality was the ship's master. The other captain, of Ukrainian origin, was not the master of the Viking Idun but served as first mate. There was also a Bulgarian first mate on board. The second mate on board for this cruise was registered in the position of seaman and not mate, according to the ship's logbook. According to information from Viking River Cruises, all these crew members had undergone their compulsory periodic simulator training.

The entire crew came from Eastern Europe and the Balkan region. None of them spoke Dutch and their command of English was also very limited. The captain had completed a limited English-language course to be able to communicate with the passengers. Much nautical communication took place in German, which is the most widely used working language in large parts of the European inland shipping network. The Western Scheldt forms an exception to this practice, where the specified working language is Dutch or English. For much of the time, the nautical crew communicated in Russian.

At the moment of the collision, the Serbian captain and Ukrainian first mate were present on the bridge. Both had a long career in inland shipping and passenger shipping, with most of their experience on the Danube. The Serbian captain had never before sailed on the Western Scheldt, while the last time the Ukrainian first mate had been in these waters was five years ago. Of the two crew members on the bridge, only the Serbian captain spoke English. He had acquired his knowledge of the English language in a course, the purpose of which was to teach him to hold short conversations with the passengers. Table 2 contains a list of the navigation licences and relevant knowledge of languages of the crew.

Position on board	Nationality	Navigation licence	Relevant language knowledge
Captain	Serbian	Austrian captain's patent and B-patent for inland shipping Serbian A-patent	German Russian English (limited)
First mate (rank captain)	Ukrainian	Rhine patent (Large patent)	German Russian
First mate	Bulgarian	Bulgarian captain's patent for inland shipping	Unknown
Seaman (rank second mate)	Croatian	Rhine patent (Large patent)	German English

Table 2: Overview of the navigation licences and relevant language knowledge of the nautical crew of the Viking Idun.

3.2.5 Safety Management System Viking River Cruises

A Safety Manual and a set of Standard Operating Procedures (SOP), Ship safety and security protocol are present on board the ships of Viking River Cruises. These two documents discuss in detail the safety rules on board the river cruise ships. More general potential risks and hazards and their mitigation are also discussed.

The Safety Manual and the SOP deal only superficially with nautical aspects, being focused mainly on the hotel function of the ship. In addition to these two documents, there is a datasheet on board, specifying the definition on average or damage, and listing the actions to be taken by crew members in the event of damage ('Datasheet Average'). This datasheet is focused on the nautical aspects of the river cruise ship.

Safety Manual

The Safety Manual⁸ states that it must be confirmed that all personnel deployed on board has received the necessary training and has been fully certified before the start of the season. The duty corporate captain, as described in section 3.2.3, and the master of the ship must confirm well ahead of the start of the journey that there are sufficient qualified personnel on board. This requirement applies to all safety personnel, namely crew members trained in the wearing of breathing masks, administering first aid and personnel with the correct navigation licences, capable of steering the ship. On the basis of the above qualifications, the Safety Manual also specifies a minimum crewing requirement, irrespective of where the vessel is sailing. According to the Safety Manual of Viking River Cruises, the minimum crewing requirement is:

- Captain and first mate (2 persons to sail the ship).
- Engineers, mates and seamen (3 persons trained to work with breathing apparatus).
- Hotel personnel (4 persons trained in first aid).

3.2.6 Datasheet Average

The Datasheet Average on board the river cruise ship states that in the event of running aground, the crew must contact the corporate captain of Viking River Cruises. This document describes average or damage as:

- all damage to the hull of the ship caused by technical or human failure.
- possible damage to the ship below the waterline as a result of a grounding, including damage to the propulsion system caused by driftwood or ropes.
- damage to the diesel or electric engine, generators, compressors and other technical systems.
- damage as a result of leakage from outside or due to a breakdown or unintended activation of the sprinkler installation.
- damage due to fire or short-circuit.
- damage caused by third parties, including human failure, suction or wave impact.
- injury to persons, with the exception of industrial accidents and accidents involving passengers, without damage to the ship.
- all damage caused by the ship to structures, locks, piers and port facilities.

⁸ The Safety Manual of Viking River Cruises is available in several languages, including English and German.

4 ANALYSIS OF THE GROUNDING AND COLLISION

The analysis of this occurrence focuses on the direct cause of the collision between the Viking Idun and the Chemical Marketer, and the underlying causes which may have resulted in the accident. The direct cause of the collision was the failure to maintain the specified shipping route (according to the SRW⁹) by the Viking Idun, which placed the vessel in the course of the Chemical Marketer. Because the Viking Idun maintained its course and crossed the navigation channel, the river cruise ship found itself in the course of the chemical tanker.

In this chapter, the underlying circumstances on board the Viking Idun which contributed to the grounding and the collision, are further analysed.

4.1 Guaranteeing competences and permits of crew members

Crew deployment

Prior to every trip, the corporate captains at the head office of Viking River Cruises check whether the crew members are qualified to sail a specified section of the journey, and whether they have sufficient experience.

On board of the Viking Idun at the time of the accident, the following crew members were present, according to the vessel's own crew list:

Captain (master):	2
First mate (master):	1
Second mate (master):	1
Seaman:	2
Engineer:	1

One of the captains occupied the position of first mate. In the Viking Idun logbook, the second mate is classified as seaman. In total, therefore, there were 3 masters (the captain and the two first mates) on board, three seamen and an engineer. On paper, the crew of the Viking Idun satisfied the crewing requirements for a hotel ship pursuant to operation mode B, with equipment standard S2 (see appendix D).

In this case, authorized did not mean the same as competent. As indicated in the demarcation of the investigation in Chapter 1, the validity of individual navigation licences and navigation authorities within the EU Member States, including the Netherlands, is not further considered. Dutch regulations on inland shipping are to a large extent based

9 SRW: Western Scheldt Shipping Regulations

on international legislation, and implemented (principally) in the Inland Navigation Act and the Shipping Traffic Act, with their underlying regulations. These often also refer back to the CCR or EU legislation. National discrepancies between the affected states in relation to these international regulations do not as a rule lead to safety problems but are mainly of an administrative nature.

At the moment of the collision, the Serbian captain and Ukrainian first mate were present on the bridge. Both had a long career in inland shipping and passenger shipping, with most of their experience on the Danube. The Serbian captain had never before sailed on the Western Scheldt, while the last time the Ukrainian first mate had been in these waters was five years ago. It can be assumed that they did not have sufficient local area knowledge to be able to guarantee a safe passage of the Western Scheldt at night.

In the area managed by the Joint Nautical Authority (GNA), which includes the Western Scheldt, the prescribed working language for VHF radio communication is Dutch or English. The entire crew came from Eastern Europe and the Balkan region. None of them spoke Dutch and their command of English was also very limited. The captain had completed a limited English-language course to be able to communicate with the passengers. Of the two crew members on the bridge at the moment of the collision, only the Serbian captain spoke English. As a consequence they were not sufficiently competent to ensure correct implementation of VHF radio communication on the Western Scheldt.

The head office of Viking River Cruises had on paper satisfied the legal requirement to place sufficient crew members on board the Viking Idun for the journey along the Western Scheldt. In practice, however, it emerged that on the basis of a lack of local area knowledge and insufficient command of the English or Dutch language, the crew was not sufficiently competent to complete the passage of the Western Scheldt safely and in line with the regulations. In this situation, the safety of more than 100 passengers was dependent on the crew.

4.2 Departure of the Viking Idun from Antwerp

If a vessel is sailed between seven o'clock in the evening and seven o'clock in the morning, it is standard practice within Viking River Cruises for a second person to be present on the bridge. Normally speaking this is a seaman, because he is needed for manoeuvring in locks or for taking over control or making a call (for assistance) if the captain becomes unwell. In this case, there were two officers on the bridge, the Serbian captain and the Ukrainian first mate.

The investigation revealed that prior to departure from Antwerp, the captain and the first mate had discussed the journey to Ghent and decided in this case to work the watch together to provide one another with the necessary support. They recognized that the Western Scheldt was a complex navigation zone. The captain had no knowledge of, or experience with sailing on the Western Scheldt, but the first mate was able to provide

this knowledge from the distant past (more than 5 years ago). However, he did not speak English. Based on their combined knowledge, they believed that they knew where they were heading and where they should report to the various traffic control centres and were convinced that by undertaking the journey together, they had arrived at an adequate solution. The decision was not taken to deploy a crew member with both the required authorities and the necessary language knowledge for the passage along the Scheldt / Western Scheldt.

Because the captain believed he had found a solution, namely jointly deploying the two most experienced crew members, including the captain himself, it was not considered necessary to inform the corporate captain, and the journey from Antwerp to Ghent was carried out without any changes being made to the plan. The investigation revealed that the captain was convinced of his own general nautical and language knowledge, and that this, in combination with the knowledge of the area of the Ukrainian mate, should have been sufficient to sail safely from Antwerp to Ghent. As a consequence, other options such as consulting with the corporate captain, deploying a pilot or temporarily halting the cruise were not considered.

By deploying the most experienced crew members on the section of the journey to be sailed, it was assumed on board the Viking Idun that an adequate solution had been found, and no other options were discussed.

In fact, only one crew member was both authorized and in possession of the necessary knowledge to be able to satisfy the working language requirement. However, this crew member was not deployed to sail the ship over the Western Scheldt. Given the chosen staffing of the bridge, the journey of the Viking Idun should not have taken place.

4.3 Complex navigation zone

This being the case, the Viking Idun set sail from Antwerp to Ghent via the Scheldt and the Western Scheldt. Also during the hours of darkness, this is a heavily used section of water where inland shipping, sea shipping and recreational shipping all come together. Certain sections of the navigation channel are also narrow, with shallows just beyond.

The combination of strong current and a tidal current together with the heavy shipping traffic, the winding navigation channel and the occasionally bright background lighting makes the Western Scheldt a high-risk navigation zone.

According to the crew of the Viking Idun, the complexity of the Western Scheldt made this passage a challenging task. According to the crew of the Viking Idun, in hindsight and based on their own statements, their years of experience, accrued mainly on the Danube, were insufficient to ensure safe sailing on the Western Scheldt. Their knowledge of the navigation zone was outdated, and due to their lack of or insufficient command of

the compulsory working languages on the Western Scheldt, Dutch and/or English, their situational awareness was limited. Communication by VHF marine radio was poorly understood, if at all. The conversations between the Terneuzen traffic control centre and the Chemical Marketer, in which agreements were reached concerning the passage, were heard but not understood by the captain and the first mate of the Viking Idun. The fact that the pilot also proposed a plan which deviated from the standard traffic rules may well have caused confusion.

The destination of the Viking Idun was the lock in Terneuzen, which meant that the navigation channel had to be crossed. Within the Western Scheldt area, traffic agreements are permitted between the traffic participants, concerning a safe passage. The SRW traffic rules do not prohibit a green-to-green passage, in line with the proposal from the pilot on the Chemical Marketer.¹⁰

The investigation revealed that the crew of the Viking Idun had seen the Chemical Marketer, but that based on their understanding of the communication, they believed that the tanker would make a turn to port ('Red side turn'). They had not understood that at the request of the traffic controller, the proposal by the pilot on the Chemical Marketer had been refused, and that the passage would be carried out red-to-red, in accordance with the standard traffic rules, not even when the traffic controller explicitly made it clear that they should turn to starboard.

The Scheldt area is a complex sea area and the crew of the Viking Idun had recognized this fact prior to their departure from Antwerp. The operator had not recognized this complexity in advance, and the Viking Idun had not been provided with a crew with the required competences and experience for this cruise. The marginal and outdated knowledge of the sea area and of the compulsory working languages contributed to a situation in which the collision could occur.

4.4 Grounding in the Nauw van Bath

Earlier that evening, the Viking Idun had run aground near the Nauw van Bath, as a result of an evasive manoeuvre to allow the passage of a car carrier. Immediately outside the navigation channel, the water becomes shallow, which is a clear example of the treacherous character of the Western Scheldt. If a vessel does run aground on the Western Scheldt, this must be immediately reported to the authorities, as outlined in the block below. A grounding can have consequences for other shipping or the technical condition of the vessel.

¹⁰ SRW art.9 lid 4.

Compulsory reporting of grounding

According to Article 51 of the Western Scheldt Shipping Regulations 1990, a captain or master of a vessel that is classified in a category of ships designated by the Western Scheldt State Harbour Master, must immediately issue a report if the vessel:

- has run aground or sunk, or
- has come into contact with another vessel and thereby suffered serious damage or if personal accidents have occurred, or
- has collided with, moved or damaged a buoy, waypoint or engineering structure, or
- has lost cargo, fuel or objects or is at risk of losing them, or
- has an on-board fire, or
- has suffered damage such that the manoeuvrability of the vessel or its safety is impaired, or
- observes an obstacle in the fairway.

For Dutch registered inland shipping vessels, if the vessel satisfies the rules laid down in the Inland Navigation Act, the competent authority, the Human Environment and Transport Inspectorate (ILT) issues an Inspection Certificate. The Inland Navigation Act specifies that the owner or captain of an inland shipping vessel for which an Inspection Certificate has been issued is not permitted to use the inland shipping vessel without the competent authority being notified, without delay, of serious damage and its repair, conversions and other fundamental changes, or the transfer of ownership.

Following a grounding, based on a risk estimate, the decision is made whether or not to investigate the ship below the waterline, for damage. If the decision is taken to examine the ship below the waterline, this takes place in the nearest port. In this case, this risk estimate was not selected.

Inspection on board

In the case of the Viking Idun, the inspection of the parts of the vessel below the waterline (see blue block) could have been carried out in the port of Hansweert. Instead, the mobile traffic controller only issued a warning to the captain of the Viking Idun for failing to immediately inform the Western Scheldt State Harbour Master following the grounding. The traffic control centre was informed of the grounding by a passing vessel, and the authorities themselves had to ask the Viking Idun about the grounding, whereas the Viking Idun itself should have initiated this contact.

According to the mobile traffic controller, the captain was able to explain in reasonably understandable English that he was in command and to explain in a manner understandable by the mobile traffic controller why the grounding had occurred. Even though the captain took some time to think about his answers, he was able to convince the mobile traffic controller in a short conversation that he sufficiently satisfied the requirement for command of the working language English. This assessment of the level of English was a personal evaluation by the mobile traffic controller, without there being

any conclusive test available. In this conversation, the captain's knowledge of nautical English was not explicitly tested by the mobile traffic controller. However, it did emerge from the investigation by the Dutch Safety Board that the captain's knowledge of nautical English was limited, and that the English he spoke had primarily been learned to enable him to communicate with guests on board.

Damage report to the operator

According to the instructions contained in the above-mentioned Datasheet Average, kept on board the Viking Idun, the crew should have informed the operator, and contacted the corporate captain. The corporate captain could then have issued instructions on whether or not to continue the journey and could have assessed whether the crew was still sufficiently fit to continue the journey. The investigation revealed that the first contact between the captain and the corporate captain only took place after the collision with the Chemical Marketer.

Following the collision with the Chemical Marketer, the Viking Idun was placed in dry dock for bow repairs. During this work, damage was discovered which could not have resulted from the collision, but could have been caused by the grounding in the Nauw van Bath.

Following the grounding in the Nauw van Bath, neither the traffic control centre nor the ship's operator were immediately informed by the Viking Idun, and the journey was not interrupted for underwater inspection. If that inspection had been carried out, the damage caused by the grounding would have been discovered. Instead, the Viking Idun merely received a warning from the supervisor for failing to report the grounding without delay, but was not instructed to have an inspection carried out of the parts of the vessel below the waterline.

On the basis of the communication via VHF marine radio concerning the grounding, there were doubts about the command of English by the crew present on the bridge. The investigation by the Dutch Safety Board subsequently revealed that the captain's knowledge of nautical English was very limited. The knowledge of nautical English was insufficiently assessed by the supervisor, partly because no appropriate language test was available to the supervisor. As a consequence, the assessment was based on a personal estimation on the part of the mobile traffic controller.

5 LEGISLATION, REGULATIONS AND SUPERVISION ON THE WESTERN SCHELDT

Dutch waters are subject to various different sets of regulations. For the majority of Dutch inland waterways, the traffic rules are laid down in the Inland Navigation Police Regulations (BPR) or the Rhine Navigation Police Regulations (RPR). In principle, all vessels on all public waters in the Netherlands are subject to the BPR. However, exceptions apply for a number of waters. In many cases, those waters are subject to the RPR, but not always. The Western Scheldt, for example has its own set of regulations, the Western Scheldt Shipping Regulations (SRW). In addition to its own set of regulations, on the Western Scheldt, several different organizations are involved in streamlining shipping traffic. Appendix C provides an overview of the organizations on the Western Scheldt, together with a description of their tasks and responsibilities.

5.1 Western Scheldt Shipping Regulations

The fairways in the area governed by the Joint Nautical Authority (GNA) are maritime fairways, each subject to their own rules. On the Ghent-Terneuzen Canal the Ghent-Terneuzen Canal, Shipping Regulations (SRKGT) apply, and the Western Scheldt is subject to the Western Scheldt Shipping Regulations (SRW). The SRW regulations apply to the Western Scheldt with its estuaries, including part of the territorial sea that runs along the municipal border from Flushing on Walcheren to Cadzand in Dutch Flanders.

These shipping regulations are based on the Convention on the International Regulations for Preventing Collisions at Sea (COLREGs), an international convention established under the auspices of the International Maritime Organization (IMO) in 1972. In the framework of the collision between the Viking Idun and the Chemical Marketer, a number of the regulations are relevant.

The SRW, for example, contains the regulation that when sailing in the direction of the fairway, the starboard side of the fairway must be followed (SRW Art. 9.1). The SRW, just like the BPR and RPR, also states that every vessel shall at all times maintain a proper lookout by sight and hearing as well as by all available means appropriate in the prevailing circumstances and conditions (for example radar) so as to make a full appraisal of the situation and of the risk of collision.

In respect of rules concerning priority, where two vessels are crossing whereby there is a risk of collision, according to the SRW, the vessel which has the other vessel on its own starboard side shall keep out of the way and, if the circumstances of the case admit, will avoid collision by crossing ahead of the other vessel.

Deviating from the BPR / RPR

As concerns crossing the fairway, the SRW contains other regulations than the BPR and RPR. According to the BPR, in accordance with article 6.04a of the regulations, a large vessel like the Viking Idun, for example when heading towards a lock on the port side of the fairway, should be permitted to announce to oncoming shipping its wish to pass starboard to starboard (green-to-green), on condition this manoeuvre can be carried out safely. The vessel must make its intention known during the daytime, by showing a blue sign combined with an all-round flashing light, and at night by showing an all-round white flashing light in combination with a blue sign. The RPR has the same rule, but the SRW does not feature the rule with the blue sign or all-round flashing light.

According to the SRW, a vessel fully or partially crossing the navigation channel may not cross the course of a vessel sailing in the navigation channel, that is following the course of the channel, if as a consequence the latter vessel would be required to change course, or reduce speed, in order to avoid a collision. The vessel wishing to cross the navigation channel must keep out of the way of the vessel following the navigation channel.

When the pilot of the Chemical Marketer became aware that the Viking Idun was headed for the Eastern Lock, he suggested to the traffic control centre that the Chemical Marketer should maintain the red side of the fairway, so that the Viking Idun could pass ahead of the Chemical Marketer, thereby crossing the navigation channel. Reaching such an agreement is not in contravention of the regulations, and from a nautical viewpoint is logical, but reaching deviating agreements can also lead to confusion. In response, the traffic controller determined that the standard shipping rules had to be followed, such that the vessels would pass each other red-to-red.

5.2 Working languages in the Scheldt area

The Scheldt area is one of the most heavily used areas of water in the world. The intensive use of the river and the often combined use by seagoing vessels and inland shipping vessels underlines the importance of the ability of the users of the fairway to be able to reach clear agreements with each other, and with the Vessel Traffic Service. This ability of vessels to communicate with each other is of essential importance in guaranteeing safety on the river and for the environment.

Since 1991, the area governed by the GNA has been covered by the Scheldt Radar Chain, a Vessel Traffic Services system (VTS system) in line with the IMO standard. Based on the guidelines of the IMO, the working language to be used in a VTS area must be English. In addition to English, the language of the area in which the VTS is based may also be employed, in this case Dutch.

Since the introduction of the Scheldt Radar Chain, on numerous occasions, via what is known as Common Notices (*Gezamenlijke Bekendmakingen*), the GNA has repeatedly issued notice of the compulsory working languages English and Dutch. In November 2010,

the GNA published the brochure 'Marine Telephone Block Classification VTS Scheldt Area', which specifies the working languages English and Dutch.

Following the coming into effect of the Common Notice no. 04-2011, since 1 January 2012, failure to comply with the compulsory working language is subject to criminal prosecution. The announcement was drawn up when the GNA observed an increase in the number of inland shipping vessels whose crew demonstrated insufficient command of the working languages English or Dutch. This resulted in hazardous situations, and the GNA believed that more stringent supervision of the correct use of the working languages in marine telephone communication was of vital importance.

In March 2019, shortly before the collision, the GNA announced publication of a flyer explaining the rules for river passenger ships. The flyer was eventually published on 15 April 2019, two weeks following the collision involving the Viking Idun. The flyer confirms that:

- it is compulsory to be conversant with the applicable marine telephone procedures;
- the working language is Dutch or English;
- it is compulsory to report the number of persons on board (crew and passengers) when entering the GNB area;
- sailing is permitted up to a wave height of not more than 1.5 metres;
- sailing is permitted from a visibility of at least 1000 metres;
- failure to comply with the above rules may result in a sailing ban or the obligation to take a pilot on board, for the vessel's own account.

5.3 Supervision of river cruise ships

Table 3 contains a list of the supervisory bodies responsible for inland shipping and hence river cruise ships. Relevant national legislation for supervision of river cruise ships by government includes the Inland Navigation Act¹¹ and the Working Hours (Transport) Decree (Atbv).¹²

Supervisory authorities for inland shipping

Inspectorate SZW (ISZW)¹³ of the Ministry of Social Affairs and Employment

Human Environment and Transport Inspectorate (ILT)

Police (national unit and docks police)

Rijkswaterstaat (RWS)

Harbour Master's Division Amsterdam and Rotterdam Port Authorities

The Provinces of Friesland, Groningen and Overijssel

Read more on the next page

¹¹ Inland Navigation Act, article 40 et seq..

¹² Working Hours (Transport) Decree, chapter 5 Inland shipping.

¹³ ISZW in practice only enforces the Working Hours (Transport) Decree.

Supervisory authorities for inland shipping

Waternet (on behalf of the Municipality of Amsterdam)

Rivierenland water authority

Table 3 Bodies responsible for supervising inland shipping.

Specifically in respect of the accident involving the Viking Idun on the Western Scheldt, Rijkswaterstaat, the ILT and the police all had a role to play in supervising enforcement of and compliance with the regulations.

The Federal Belgian and/or Flemish supervisory authorities also play a role on the Scheldt/Western Scheldt. Agreements have been reached on supervision under the auspices of the Common Nautical Management (GNB). These agreements primarily relate to supervision of the pilot services and supervision of the performance of the objects deployed to promote safety and the smooth flow of shipping traffic, and maintaining the navigation channels. These agreements do not relate to inspection of or compliance with the rules on board ships.

Certification of river cruise ships

Most types of inland shipping in Europe are subject to compulsory certification. Ships are certified according to European Directives, and following approval are issued with an Inspection Certificate (CvO). This inspection process has been entrusted by the competent authorities (in the Netherlands the Minister of Infrastructure and Water Management) to specifically designated classification societies. Following approval, an Inspection Certificate is issued by the ILT. This compulsory certification also applies to river cruise ships. The (technical) requirements of the certificate are laid down in the Dutch Inland Navigation Act, Inland Navigation Regulations and the Inland Navigation Decree, and are based on European regulations. Periodically, which for passenger ships means every five years, and in the event of serious damage, renovation or transfer of ownership, the Inspection Certificate must be renewed, and is subject to a new inspection.

With regard to passenger ships, other requirements have been laid down concerning stability, maximum passenger numbers, escape routes, minimum freeboard and the safety systems and safety equipment. For hotel ships, in other words passenger ships on which the passengers sleep overnight such as the Viking Idun, a number of further additional requirements apply. All these requirements are checked prior to the issuing of the Inspection Certificate. The Inspection Certificate for the Viking Idun was issued in Germany on 25 October 2011 by the classification society Germanischer Lloyd. On 7 August 2017, a supplementary Dutch community inland shipping certificate for inland shipping vessels was added. Both certificates were valid at the moment of the collision.

No structural international supervisory arrangement

For seagoing shipping, there is a harmonized system for Port State Control, the aim of which is to reduce the number of vessels that fail to satisfy the specified standards and regulations. This system is recorded in the Paris Memorandum of Understanding (PMOU) that dates from 1982, and that offers the advantage of registering whenever a ship is inspected, thereby determining the last occasion on which an inspection was carried out and the relevant findings.

There is no such structured system for inland shipping. There is no international exchange of inspection data, and even at national level, the various supervisory bodies do not always coordinate with one another. An evaluation of the supervision of inland shipping undertaken by Twynstra Gudde¹⁴ in 2018 revealed that the parties that are under supervision often note that the authorities are not aware of previous inspections. The evaluation also revealed that there is no adequately functioning system for the gathering of inspection data. The data are for example not always shared in the existing system, which goes by the name of *Inspectieview*.

Inspections by the Human Environment and Transport Inspectorate (ILT)

The ILT carries out company inspections and object inspections within the inland shipping sector. The company inspections, which only the ILT is authorized to carry out, take place at the company or involve information being requested from the company. Company inspections are announced in advance, at least two months before the planned inspection date. The announcement also specifies which vessels will be inspected. The number of vessels to be inspected depends on the size of the fleet. Which vessels are to be inspected is also announced in advance. The company inspections are based on the Inland Navigation Act and the Working Hours (Transport) Decree.

Risk class		Eligible for inspection if:
A	10%	The vessel has not been inspected in NL for more than 3 years
B	20%	The vessel has not been inspected in NL for more than 2 years
C	40%	The vessel has not been inspected in NL for more than 1 year
D	20%	The vessel has not been inspected in NL for more than 6 months
E	10%	The vessel has not been inspected in NL for more than 3 months
Unknown ¹	74%	Eligible for inspection

Figure 12: Classification in risk classes indicating when a ship is eligible for inspection. Source: ILT, Supervision and enforcement of inland shipping: Inland Navigation Act and Working Hours (Transport) Decree, 30 November 2019.

The object inspections carried out by the ILT, which can in fact also be carried out by other supervisory authorities, are carried out on the basis of identified risks, according to the classification into risk classes (see figure 12). This classification into risk classes is based on previous inspections. In the evaluation by Twynstra Gudde referred to above, it emerged that on 1 July 2018, the risk class of only one quarter of all inland shipping

14 Twynstra Gudde, *Evaluation of the supervision of inland shipping*, 14 September 2018.

vessels was known. This group of vessels is classified into risk classes A through to E, the largest proportion consisting of class C (see figure 12). The remaining three quarters (74%) have never been inspected, and are automatically eligible for inspection, for classification into categories A through to E. According to the evaluation by Twynstra Gudde, this relates to more than 16,000 vessels.

During object inspections, the applicable regulations are checked. Technical aspects can also be inspected, but only to determine whether the situation is compliant with the Inspection Certificate, issued when the vessel was certified. Whether the vessel satisfies the European Standard laying down Technical Requirements for Inland Navigation vessels (ES-TRIN) is not part of the object inspection, because these aspects are tested during the certification process. In the case of the Viking Idun, all certificates were valid, and any object inspection would have revealed little. The crew is not a fixed element of the vessel, and compliance with the crewing requirements on a vessel, during an inspection is no guarantee for the future. The inspection reflects a particular point in time.

Inspections as secondary task

Supervision and enforcement of the Inland Navigation Act is only a primary task for the ILT. For all other supervisory authorities, it is a secondary task, alongside a whole raft of other tasks. The evaluation by Twynstra Gudde, already mentioned above, revealed that this makes it difficult to determine how many supervisory authorities actually actively supervise inland shipping traffic. The mobile VTS-operators¹⁵ from Rijkswaterstaat are all designated as nautical inspectors, but in practice only a small proportion of the available capacity is deployed for enforcement work in respect of the Inland Navigation Act. As a rule, most of their attention is focused on use of the fairways and the traffic rules, or providing assistance in the event of incidents. Actual inspection work is only carried out to a limited extent.

The infrastructure division of the national police unit is also tasked with enforcing the Inland Navigation Act, but this division has a wider remit and is therefore also involved with aviation, railway and road traffic. It should also be noted that in this supervisory role, the police are primarily involved in criminal prosecutions following an incident and less in preventive inspections.

The task of supervising the Inland Navigation Act and the Working Hours (Transport) Decree is shared across a variety of parties, with no harmonized system. Risk-based object inspections are based on a risk classification according to which, at this time, practically all vessels are eligible for inspection. On the Western Scheldt, three parties have been tasked by the Dutch State with supervising inland shipping, in addition to their other tasks.

The Minister of Infrastructure and Water Management has taken note of the outcomes of the evaluation by Twynstra Gudde, and shared those outcomes with the Dutch House of

¹⁵ See also Chapter 6 Role of Rijkswaterstaat on the Westerscheldt

Representatives at the end of 2018.¹⁶ In the letter to the House of Representatives, the Minister concluded that given the large number of supervisory organizations, it has proven a difficult task to introduce a uniform approach to supervision of the Inland Navigation Act. The Minister suggested to the House of Representatives that an investigation should be carried out to determine whether it is possible to introduce greater uniformity in supervision, for example by reducing the number of supervisory bodies. There are also plans to increase capacity. To date, the situation has remained unchanged.

6 THE ROLE OF RIJKSWATERSTAAT ON THE WESTERN SCHELDT

The Scheldt and the Western Scheldt (the Scheldt area) are unique waterways, in a number of respects. The Western Scheldt forms an open connection to the North Sea and is consequently subject to complex tidal currents. Moreover, the Western Scheldt is intensively used both by sea shipping, as an important route from/to the port of Antwerp, inland shipping, including passenger shipping, and recreational shipping. In that sense, the area also occupies a separate position in terms of applicable legislation and regulations, and the supervision of compliance with those regulations.

As already stated, a whole raft of organizations are involved in the coordination of shipping on the Scheldt and Western Scheldt (see chapter 5.3 and Appendix C). Supervision of shipping on the Western Scheldt, and of inland shipping in general, is undertaken in the Netherlands by a number of different parties. This chapter discusses the role of Rijkswaterstaat in the supervision of river cruise ships, and the extent to which that supervision played a role in the collision between the Viking Idun and the Chemical Marketer.

6.1 The role of mobile VTS-operators from Rijkswaterstaat as supervisory body.

The task of mobile traffic controller was established by Rijkswaterstaat partly as a means of implementing the task of the organization as a nautical supervisory body on Dutch inland waterways.

The tasks of the mobile traffic controller:

The more than 100 mobile VTS-operators operate from the 27 Rijkswaterstaat patrol vessels and 15 rapid intervention vessels (RHIBS).

Qualified as special investigating officers (BOAs), the mobile VTS-operators are responsible for the enforcement of legislation and regulations on the water. As a rule, one mobile traffic controller is included in the crew of each vessel. This means that when carrying out his role as nautical enforcer on board a ship, the mobile traffic controller works alone.

A number of mobile VTS-operators are also classified as Duty Officers (OVD). An OVD is called in following major incidents, and is responsible for assisting the emergency services in dealing with the consequences of these incidents.

The other tasks of the mobile traffic controller, not related to enforcement, include:

- offering guidance to shipping traffic at events, incidents, during work and special transport operations
- in the event of disasters, enabling the emergency services to carry out their work, and clearing the channels as quickly as possible
- checking lighting, buoys and signposts along navigation channels
- checking and removing pollution and hazardous obstacles and identifying polluters
- assisting the emergency services in searches, for example for missing persons
- measuring and issuing communication about the depth of navigation channels, so that boatmasters know the volume of cargo they can carry
- during the summer months, informing recreational users about safe sailing rules and informing swimmers of the dangers of currents and shipping.

Rijkswaterstaat operates three patrol boats in the Western Scheldt area, including the Ghent-Terneuzen Canal. One is stationed in Flushing, one in Hansweert and one on the Ghent-Terneuzen Canal. Of the two boats on the Western Scheldt, one is available 24/7 (Flushing) and the other (Hansweert) 16 hours a day on working days. During each shift, one mobile traffic controller is part of the crew of both boats. During daytime hours on working days, in a number of cases, a second mobile traffic controller is available. For the entire Western Scheldt area (from the Belgian border to the North Sea), this means that one mobile traffic controller is permanently available with a second mobile traffic controller for most of the day. These are the only two supervisors from Rijkswaterstaat for nautical legislation and regulations, including the Western Scheldt Shipping Regulations (SRW), who are active on the Western Scheldt.

Given the volume of different types of traffic participants (seagoing shipping, inland shipping, recreational shipping) on the Western Scheldt, and the non-standard regulations that apply in this area (SRW), it can be concluded that the level of nautical enforcement provided by Rijkswaterstaat is limited. Moreover, mobile VTS-operators often operate individually. This reduces the likelihood of preventive action. Also in any disaster response situation, choices often have to be made. For example, following the collision between the Viking Idun and the Chemical Marketer, the mobile traffic controller was forced to decide which of the two vessels would receive his primary attention. In consultation with the GNA, he opted for the Viking Idun, because the information available suggested that the Viking Idun was the most vulnerable vessel. Nonetheless, the damage to the Chemical Marketer and the risk of the spillage of the cargo's hazardous substances also deserved his attention. Only following the arrival of the second patrol vessel from Flushing and of the Rijkswaterstaat Water Duty Officer could any attention be paid to the Chemical Marketer.

There is no specific supervision programme aimed at river cruise ships. Interviews have revealed that the mobile VTS-operators are aware that crewing and communication problems regularly arise, but that given the combination of the design of the majority of river cruise ships and the often troublesome waters of the Western Scheldt, it is no easy

task to come alongside and board these vessels, while they are sailing. In addition, river cruise ships often sail at night, when the capacity of mobile VTS-operators is even further restricted. The mobile VTS-operators only physically go on board a river cruise ship following incidents such as the grounding of the Viking Idun at the Nauw van Bath and the subsequent collision near Terneuzen.

The mobile traffic controller is the nautical enforcer operating on behalf of Rijkswaterstaat. On a busy and complex river like the Western Scheldt, the availability of one or two mobile VTS-operators for the extensive area is limited. Despite the fact that the mobile VTS-operators have sufficient authorities and enforcement tools at their disposal, the situation cannot be described as ensuring sufficient adequate supervision.

6.2 Traffic control centres and the authorities of VTS-operators

Shipping traffic on Dutch inland waterways is motored by a series of traffic control stations and centres. On the Western Scheldt, the Vessel Traffic Service (VTS) is organized in what is known as the Scheldt Radar Chain (SRK), which in turn is the responsibility of the GNA. The SRK comprises thirty unmanned radar stations and five manned traffic control centres: Zeebrugge, Flushing, Terneuzen, Hansweert and Zandvliet. The centres in Flushing, Terneuzen and Hansweert are on Dutch territory and are managed and staffed by Rijkswaterstaat. VTS-operators are supervised by a Regional Traffic Controller (watch commander).

The overall objective of a VTS is as follows:

The purpose of Vessel Traffic Services is to improve the safety and efficiency of navigation and to maintain the safety of human life and to protect the environment and/or the adjacent shore areas and the nearby residents and businesses from the possible adverse effects of shipping traffic.¹⁷

Unlike air VTS-operators and train VTS-operators, for example, the role of the VTS controller is indicative rather than imperative. The VTS informs shipping, warns of imminent danger and issues masters with advice, but is unable to issue direct orders in respect of actions to be taken. The relevant guidelines state:

¹⁷ Guidelines and criteria for Vessel Traffic Services (VTS) on inland waterways (VTS Guidelines 2006).

When the VTS is authorized to issue instructions to vessels, these instructions should be result-oriented only, leaving the details of execution, such as the course to be steered or manoeuvres to be executed, to the master. Care should be taken that VTS operations do not encroach upon the master's responsibility for safe navigation or disturb the traditional relationship between the master and pilot, wherever applicable.

At the end of the day, the master or captain of the vessel bears final responsibility. Agreements between traffic participants must also be made directly between the vessels, and not via the traffic control centre.

Although the VTS has an informative and advisory role, the requirement of vessels to report to the VTS is binding. At predetermined reporting points, vessels are required to issue a report, so that the VTS is kept informed of the intentions of the vessels in its management area. The report must include the ship's name, position, draught, planned route and destination. For river cruise ships, it is also important that they report how many passengers are on board.

In this way, VTS-operators also have a signalling role. Because the VTS-operators observe the shipping in the area under their control, they can also take note of deviations, such as the incorrect use of the fairway, violations of traffic rules or failure to comply with the compulsory working languages. The VTS can call vessels to account on these points and if necessary can take measures, for example via the competent authority, sending out a mobile traffic controller or issuing a shipping traffic instruction.

Shipping traffic instructions

The task of the VTS in ensuring the rapid and efficient handling of shipping traffic also includes the authority to issue shipping traffic instructions. In the absence of contradictory safety reasons, which must be immediately reported, a shipping traffic instruction is legally binding. By means of a shipping traffic instruction, a prohibition can be imposed on one or more traffic participants aimed at achieving a specific result in terms of traffic behaviour. The halting of a ship or ordering compulsory pilot assistance are examples.

A shipping traffic instruction cannot be automatically issued by a traffic controller, but instead must be discussed with the duly authorized person. On the Western Scheldt, the competent authority is the GNA. If allowed by the situation, in other words if there is sufficient time, the (regional) traffic controller will consult with the competent authority (GNA). Only in the face of acute danger may the (regional) traffic controller issue an immediate shipping traffic instruction, the nature of which must subsequently be fed back to the GNA.

Complexity of the traffic control centre in Terneuzen

At the traffic control centre in Terneuzen, the VTS-operators at work not only supervise shipping on the Western Scheldt but are also responsible for the coordination and planning of the lock systems. The inward and outward passage through the locks can result in complex and busy situations that have to be dealt with as quickly and efficiently as possible by the VTS-operators and the lock keepers. The VTS-operators are seated alongside the lock keepers, to ensure that any discussion is dealt with quickly and efficiently (see figure 13 for the staffing of the traffic control centre in Terneuzen).

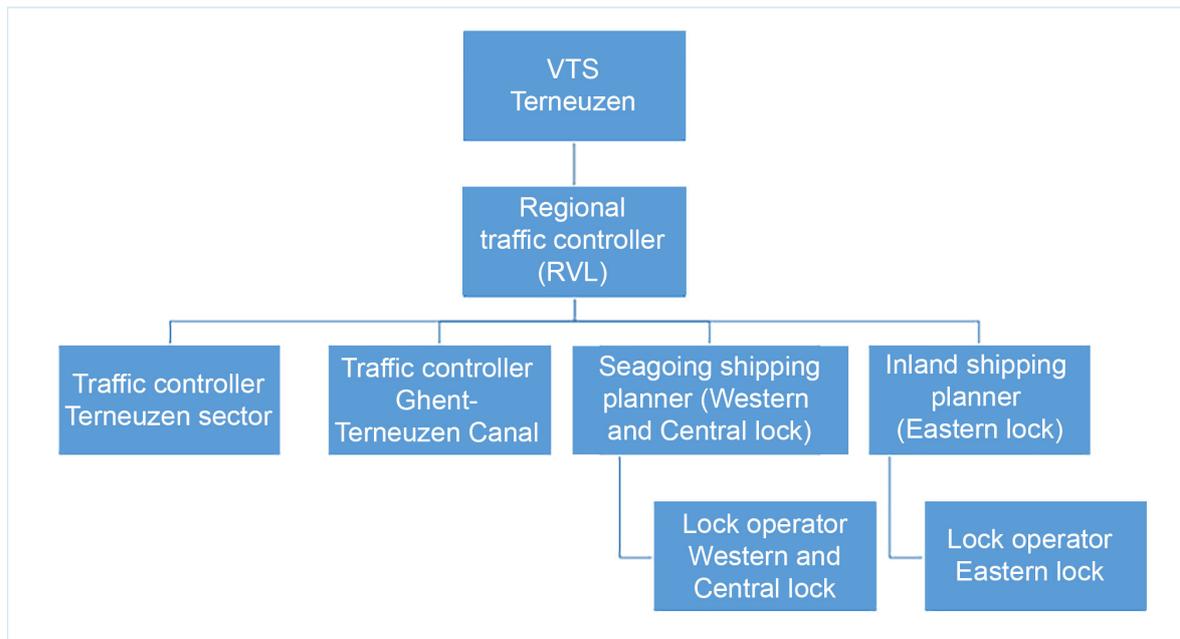


Figure 13: Staffing of the Traffic Control Centre in Terneuzen. (Source: *The Added Value of the Terneuzen nautical traffic control centre*, R. Kint, HZ University of Applied Sciences)

In the case of the Chemical Marketer, taking account of the outgoing shipping exiting the lock and the local dredging activities, the traffic controller decided it would be wiser to instruct the red-to-red passage of the Viking Idun, in line with the shipping traffic rules. The plan put forward by the pilot could have led to a chain reaction, because if that plan had been followed, the Viking Idun would have come into a conflict situation with outgoing shipping. The situation whereby the Viking Idun would fail to turn to starboard, and would turn to avoid the Chemical Marketer was not foreseen.

The VTS-operators (VTS operators) from Rijkswaterstaat who guide shipping traffic on the Western Scheldt mainly have a guiding role. They can take note of problems and violations and respond accordingly, for example by sending out a mobile traffic controller or issuing a shipping traffic instruction. However, supervision is not their primary task.

Lessons learned:

The collision between the Viking Idun and the Chemical Marketer has been analysed within the Nautical Safety Committee of the GNA, which includes representatives both from Rijkswaterstaat and the Pilotage Service (Loodswezen). This analysis revealed among others that it is desirable for VTS-operators to respond more proactively, and to issue a warning to a ship at an earlier stage if there is a threat of a dangerous situation occurring. However, these actions must remain within the frameworks of the autonomy of shipping as applicable on the Western Scheldt, a point further underlined by the Pilotage Service.

In addition to the analysis by this committee, the GNA also issued a new Common Instruction VTS-SG (VTS Scheldt area), which describes how VTS-operators are expected to respond to problems with the working language. This instruction was prepared because the GNA has recognized that traffic control centres and mobile VTS-operators do not always react effectively when faced with communication problems.

If problems do arise with the working language, the traffic control centre must:

- Submit a report to the GNA
- Attempt to encourage the vessel to return to the port, where the vessel should moor up until a person is present on board who does have a command of the compulsory languages; If turning the vessel around is not possible from the point of view of safety, the vessel should be halted at the next port or anchorage;
- The GNA or traffic control centre must inform a mobile traffic controller, and request a visit to the vessel in question by the traffic controller, as quickly as possible;
- The vessel may continue its journey once there is a person present on the bridge who has a sufficient command of Dutch or English; The traffic control centre will monitor this situation and keep the GNA informed;
- The incident must be recorded in the daily log of the traffic control centre, and in the log kept at GNA;
- The GNA will duly inform the relevant traffic control centre of the actions taken by the mobile traffic controller.

In 2020, an enforcement programme was launched by RWS on the Western Scheldt, as part of which vessels can be inspected unannounced and for preventive purposes, for example in respect of working language and certificates of competence. The programme will continue through to September 2020. Over the subsequent months, the results will be evaluated and shared with the sector.

7 CONCLUSIONS

Course of events

The direct cause of the collision was the failure by the Viking Idun to maintain the specified shipping route (according to the SRW), which placed the vessel in the course of the Chemical Marketer. Because the Viking Idun maintained its course and crossed the navigation channel, the river cruise ship found itself in the course of the chemical tanker. The pilot and the mate on the Chemical Marketer were unable to avoid the collision.

An agreement was reached between the pilot, the traffic control centre and the Viking Idun about the red-to-red passage. In hindsight, it can be concluded that the crew of the Viking Idun failed to understand this agreement, or did not act accordingly, and as a consequence they were unable to avoid the collision. The outdated knowledge of the navigation zone and a limited understanding of the compulsory English language, in particular nautical English, on the part of the two crew members on the bridge of the Viking Idun were the underlying cause. As a consequence, the Viking Idun deviated from the prevailing traffic rules, thereby seriously threatening the safety of the passengers and crew on board the Viking Idun and the crew of the Chemical Marketer. In the event of a spillage, the cargo of the Chemical Marketer could also have caused serious environmental damage.

The crew of the Viking Idun was placed in this situation when their operator deployed them on this journey, without having checked sufficiently whether they were fully qualified and had the required experience (and competence). The crew of the Viking Idun, on paper at least, broadly complied with the applicable rules and requirements, with the exception of the requirement on working language, as contained in the SRW. However, in this case, authorization does not mean the same as competence. Only one crew member was both authorized and in possession of the necessary knowledge to be able to satisfy the working language requirement. However, this crew member was not deployed to sail the ship over the Western Scheldt. Undertaking a journey without there being a crew member present on the bridge who is both authorized and competent should no longer be possible, in the future.

In the run-up to the collision, a number of safety barriers failed. Firstly, the operator failed to check sufficiently in advance whether the crew was both sufficiently qualified and competent for the journey, and the crew failed to consult with the corporate captain prior to departure from Antwerp. Secondly, the mobile traffic controller who came on board following the grounding was not adequately equipped to carry out a night-time check on the working language requirement and crew. Moreover, he came aboard the Viking Idun alone, without the necessary support from a second colleague. Thirdly, the agreements between the pilot, traffic control and the Viking Idun were not complied with by the Viking Idun and as such proved ineffective. It can be concluded that not only did a number of safety barriers fail, but that such safety barriers were in fact insufficiently in place.

Regulations and supervision

The Western Scheldt is a complex navigation zone that is intensively professionally sailed both by sea shipping and inland shipping, including river cruise ships. Nonetheless, for sailing the Western Scheldt, there are no additional provisions in legislation and regulations for inland shipping, relating to local knowledge of the crews, similar to the requirements that do apply on the Rhine. For sea shipping, this fact is compensated for by the obligation to call in pilot assistance. In addition, the question whether the crew had sufficient command of the required working languages (English or Dutch) was insufficiently tested.

The absence of additional provisions for inland shipping for the Western Scheldt area and the shortcomings in tests for command of the required working language are barriers to safe passage by river cruise ships.

There is no structural international supervision arrangement for inland shipping of the kind that applies to sea shipping. As a result, inspection details are not exchanged. This forms an obstacle to the efficiency of the supervising body and the vessels under supervision.

Supervision and enforcement in inland shipping in the Netherlands are insufficiently coordinated, whereby unlike for the Human Environment and Transport Inspectorate (ILT), the supervision process is not a primary task either for Rijkswaterstaat, the police or a number of the other supervisors. To make matters worse, the various supervisors are unable to access each other's data. This makes the risk-based implementation of object inspections more difficult, because the risk classification is based on these inspections. On the Western Scheldt alone, and only in the Netherlands, there are at least three parties that are charged with supervision, in addition to a whole raft of other tasks. On top of that there are also Flemish / Belgian supervisory bodies active in the area.

The Viking Idun satisfied the requirements imposed on river cruise ships in accordance with (European) law, and on that basis was permitted to sail in the Netherlands. The certificates issued were valid. An object inspection on board the Viking Idun would probably not have revealed any major problems, if at that time crew members had been present on board who satisfied the requirements. In other words, an object inspection is sufficient to approve the vessel itself, but such an inspection cannot prevent a crew boarding the vessel, whose members do not satisfy the requirements. Inspections of this kind therefore represent an insufficient safety barrier for the observed problems in respect of the competence of the crew.

In respect of the deployment following the collision and the earlier grounding in which the Viking Idun had been involved, Rijkswaterstaat was the primary supervisory body. The investigation revealed that for the Western Scheldt area, Rijkswaterstaat fulfils its share of the nautical supervision task by deploying mobile VTS-operators. The limited capacity available and as a result the limited deployability, together with the absence of a functioning test tool to check the command of the working language in situ, are insufficient to be described as effectively fulfilling the supervisory task.

8 RECOMMENDATIONS

In the river cruise sector, additional attention is needed for safety, especially in the light of the growth experienced and the large number of passengers transported on these ships. This need is further enhanced because many of the passengers have restricted capacity to cope independently. Against that background, the Dutch Safety Board issues the following recommendations:

To Viking River Cruises and other operators active in the river cruise branche:

1. Ensure that during each journey by a river cruise ship, a fully qualified and competent nautical crew is present on the bridge.
 - a. Develop, implement and enforce a customized training programme for the nautical crews, with periodic skills testing.
 - b. In that process, specifically focus attention on command of (foreign) languages (including nautical English) and sufficient local knowledge of the proposed shipping routes.

To the Joint Nautical Authority, the Minister of Infrastructure and Water Management and the Flemish Minister of Mobility and Public Works.

2. Tighten up the authorization and competence requirements for nautical crews on river cruise ships within the Scheldt area, making use of the option of including additional provisions in the Western Scheldt Shipping Regulations to ensure safe passage by river cruise ships. Possible provisions relate to familiarity with the navigation zone and/or the obligation to take a pilot on board, if this knowledge is not present. Also investigate whether these measures can be secured internationally.

To the Minister of Infrastructure and Water Management:

3. Improve the effectiveness of supervision on river cruise travel:
 - a. Develop a supervision arrangement for coordinated supervision of river cruise shipping.
 - b. Develop a set of tools for effective enforcement of the working language requirement.
 - c. On a structural basis, investigate accidents and incidents involving river cruise ships. Subsequently take action based on the lessons learned and share these lessons and findings with international partners.

Centraal Bureau voor de Rijn- en Binnenvaart (CBRB):

4. Share the findings and lessons learned from this investigation within your national and international network, including the Ledengroep Personenvervoer.

VESSEL DATA VIKING IDUN

Vessel data	Viking Idun
Photograph:	
Call letters:	HE7388
ENI number:	07001951
Flag State:	Switzerland
Home port:	Basel
Type of ship:	Passenger ship
Classification society:	Germanischer Lloyd
Year of construction:	2011
Shipyard:	Neptun Werft GmbH, Rostock
Length overall (Loa):	134.84 m
Length between perpendiculars (LPP):	134.67 m
Breadth:	11.45 m
Actual draught:	1.7 m
Gross Tonnage:	3500
Number of passengers:	171 (max. 190)

Vessel data	Viking Idun
Engines:	2 Caterpillar Inc. C32 0K8351 generators 1 Caterpillar Inc. C18 0K8617 generator 1 Caterpillar Inc. C18 0K8616 generator
Propulsion:	Diesel electric: 4 Schottel STP 200 rudder propellers, 1 bow thruster
Maximum propulsion capacity:	1312 kW
Maximum speed:	15
Vessel certificates:	Valid

COMMENTS ON DRAFT REPORT

A draft version of this report, with the exception of the summary, consideration and recommendations, was submitted to the parties directly involved. These parties were requested to check the report for any factual inaccuracies and ambiguities. The draft report was submitted to the following parties:

- Viking River Cruises GmbH
- Chemship BV
- Ministry of Infrastructure and Water Management (DGLM, RWS, ILT)
- Permanent Committee – Joint Nautical Authority (GNA)
- Dutch Pilotage Region River Scheldt

The Board has taken note of the responses received. The responses and explanations are listed in a table which is available on our website www.safetyboard.nl.

All comments that were considered relevant by the Board, have been incorporated in the report. Comments that have not been incorporated in the report are also listed in the aforementioned table together with an explanation on the Board's decision.

PARTIES INVOLVED IN SHIPPING ON THE WESTERN SCHELDT

Joint Nautical Authority

On the Western Scheldt, a number of organizations are involved in ensuring the efficient and safe management of shipping traffic. The Joint Nautical Authority (GNA), Rijkswaterstaat and the Pilotage Service (Loodswezen) are the main players.

Management of the Western Scheldt is a collaborative operation with Flanders as laid down in the *Treaty between the Kingdom of the Netherlands and the Region of Flanders in the matter of common nautical management in the Scheldt area (Verdrag tussen het Koninkrijk der Nederlanden en het Vlaams Gewest inzake het gemeenschappelijk nautisch beheer in het Scheldtgebied)*. The Joint Nautical Management (GNB) is undertaken by the Joint Nautical Authority. The GNA is involved in developing policy and regulations on the Western Scheldt, but also has a number of operational tasks, for example coordinating shipping traffic, setting conditions for the arrival and departure of a vessel based on existing rules, regulating traffic movements and issuing mandatory instructions to shipping to avoid dangerous situations and congestion, drawing up sailing plans with particular attention for vessels carrying hazardous substances, vessels with a deep draught or other special vessels, ensuring coordination between traffic control centres and issuing advice in the event of disasters.

Following approval by a Permanent Committee, additional requirements can be issued to promote safer and more efficient shipping traffic on the Western Scheldt in the form of common notices.

The coordination of shipping traffic is managed from the Scheldt Coordination Centre in Flushing. For the purposes of this investigation, other relevant traffic control centres are the centres in Zandvliet Antwerp, the Hansweert traffic control centre and the Traffic Control post at Terneuzen.

Rijkswaterstaat

On behalf of the Minister of Infrastructure and Water Management, Rijkswaterstaat is the agency responsible for the development, management and maintenance of national roads, main navigable waterways and the main water system. Rijkswaterstaat manages what is known as the main water management system: the large rivers and canals and the North Sea. The Minister of Infrastructure and Water Management bears (final) responsibility for nautical management and the water quality of all navigable waterways, whereby Rijkswaterstaat is the authorized body in respect of water quality. Rijkswaterstaat is made up of national and regional departments: a central organization, seven regional services and seven national organization elements.

The common nautical management on the Western Scheldt is the responsibility of Rijkswaterstaat Sea & Delta. The tasks entrusted to Rijkswaterstaat relevant to this investigation including traffic management (VTS) are undertaken under the auspices of the GNA, by staff of RWS VWM South-West region.

Nederlands Loodswezen (Dutch Pilotage Region River Scheldt)

The Nederlands Loodswezen is an independent organization that consists of two components: the Nederlandse Loodsen Corporatie (NLC) and Nederlands Loodswezen BV (NLBV).¹⁸ Seagoing vessels entering and leaving Dutch seaports are in principle required to seek advice from a pilot. The same applies to entering and leaving the ports of Flanders, such as Antwerp, if this requires passing through Dutch waters. The Pilotage Act states that pilotage services may only be provided by authorized and registered pilots.

The registered pilots of the Region River Scheldt operate in all ports on the Western Scheldt and in the Scheldt area. Pilotage services are provided by both Dutch and Flemish registered pilots. The close cooperation between the Flemish and Dutch pilots starts in the estuary of the Western Scheldt. The Dutch-registered pilots on the Scheldt sail at sea and in the Ghent-Terneuzen Canal or at sea and on the river to Antwerp. Pilots are embarked and disembarked by one of three different pilot boats, depending on the location and situation.

The Flemish pilot service provides this service from the Wandelaar station while the Dutch pilot service operates the Steenbank station. The Flemish pilot station Wandelaar is located at Oostende while the Dutch pilot station Steenbank is located 12 miles from Westkapelle.

There are two registered pilots present at the Scheldt Coordination Centre. One registered pilot acting as duty pilot controller and who is responsible for nautical affairs, and one registered pilot who in his capacity as Steenbank pilot is responsible for safe traffic handling to the pilot station, in collaboration with the traffic control service and the Steenbank Traffic Centre.

¹⁸ In addition to the NLC and NLBV, the Loodswezen consists of four regional maritime pilots associations: Noord, IJmond, Rotterdam-Rijnmond and Scheldemonden.

CREWING REQUIREMENT AND OPERATION

For inland shipping vessels, such as river cruise ships like the Viking Idun, regulations have been drawn up concerning minimum crew numbers. The number of crew members required will depend on the vessel type, the equipment standard of the ship and the number of hours sailing per day, in other words the operation mode.

Group	Crew members	Number of crew members for operation method A1, A2 or B and for equipment standard S1 or S2						
		A1		A2		B		
		S1	S2	S1	S2	S1	S2	
3. Permitted number of beds: more than 100	Master	1 of	1	1	2	2	3	3
	Officer	1	1	1	-	-	-	-
	AB seaman	-	-	-	-	1	-	1
	Seaman	2	1	1	3	1	3	1
	Ordinary seaman	-	2	1	-	1	-	1
	Engineer	1	1	1	1	1	1	1

Figure 14: The minimum crewing on hotel ships (Source: Inland Navigation Regulations Article 5.6.4)

The operation mode is divided into three categories, A1, A2 and B, whereby each category represents restrictions concerning sailing times.

Maximum sailing time per 24 hours:	Compulsory rest times:
A1 14	Between 22.00 and 06.00 hours
A2 18	Between 23.00 and 05.00 hours
B 24	None

The sailing times must be recorded in the sailing log which must be present on the bridge. Deviation from these sailing times is permitted if the time is registered by an approved and authorized tachograph. If a tachograph is used, in operation mode A1, sailing times may be extended up to a maximum of 16 hours once a week, on condition that besides the master, one other crew member is present on board, who is qualified as mate.

The equipment standard of the ship is classified according to two categories, Standard S1 and Standard S2. Standard equipment S2 for passenger ships includes a bow thruster installation that can be operated from the bridge.¹⁹

Equipment of the Viking Idun

The Viking Idun is equipped with a bow thruster and therefore is classified as Standard S2. Since the ship sailed both night and day, operation mode B applies. The minimum crew for a hotel ship in operation mode B with equipment standard S2 is:

Master:	3
AB seaman:	1
Seaman:	1
Ordinary seaman:	1
Engineer or seaman/motorman:	1

¹⁹ Regulations regarding shipping personnel on the Rhine (RSP), article 3.14.

BACKGROUND INFORMATION CHEMICAL MARKETER & CHEMSHIP

Vessel data	Chemical Marketer
Photograph:	
Call letters:	9HA2018
IMO number:	9304291
Flag State:	Malta
Home port:	Valletta
Type of ship:	Chemical Tanker
Classification society:	Nippon Kaiji Kyokai (NK)
Year of construction:	2003
Shipyard:	Asakawa Shipbuilding Company Ltd
Length overall (Loa):	134.16 m
Length between perpendiculars (LPP):	125 m
Breadth:	20.53 m
Actual draught:	8.8 m
Gross Tonnage:	8261
Engines:	1 Hitachi B&W 7S35MC (Mk-7)
Propulsion:	1 fixed propeller with four blades, 1 bow thruster

Vessel data	Chemical Marketer
Maximum propulsion capacity:	5180 kW
Maximum speed:	14.9 knots
Vessel certificates:	Valid

The Chemical Marketer is a chemical tanker with a length of more than 134 metres, built in 2004. The ship is operated by Chemship B.V. based in Capelle aan den IJssel, the Netherlands. Chemship, which was founded in 1969, operates a total of thirteen chemical tankers, focusing primarily on the trade routes from the Eastern Mediterranean to Northern Europe and the United States. The operator's head offices are based in the Netherlands. None of the vessels sail under a Dutch flag. The ships are registered in Malta, Singapore, Panama and Liberia.

On 1 April 2019, the Chemical Marketer was travelling from Turkey to Antwerp carrying a cargo of benzene, heptane, naphtha and naphthalene. In total, the crew consisted of 22 people (see table 5).

Position	Nationality	Number
Captain	Turkish	1
First mate	Ukrainian	1
Second mate	Indian	1
Third mate	Indian	2
Trainee engineer	Indian	1
Chief Engineer	Latvian	1
Second engineer	Vietnamese	1
Third engineer	Indian	1
Fourth engineer	Indian	1
Electrotechnical officer (ETO)	Indian	1
Fitter	Indian	1
Pumpman	Indian	1
AB seaman	Indian	3
Seaman	Indian	1

Position	Nationality	Number
Motorman	Indian	3
Purser	Indian	1
Steward	Indian	1

Table 5: Crew composition Chemical Marketer

Safety Management System on board the Chemical Marketer

For seagoing cargo vessels larger than 500 GT²⁰ and seagoing passenger ships, the international SOLAS Convention requires that a safety management system is operated on board that satisfies the requirements laid down in the International Safety Management Code (ISM Code) developed for that purpose.²¹

The ISM Code specifies that a 'company' must be formally designated to adopt the obligations and responsibilities laid down in the ISM Code, from the owner of the vessel. In the Netherlands, instead of the word 'company', the term 'ship manager' is commonly used. The way in which work is carried out on board a ship in respect of (environmental) safety must therefore be an integral part of the safety management system (SMS) drawn up and implemented subject to the responsibility of the ship manager. This includes developing, implementing and maintaining procedures, plans and work instructions aimed at guaranteeing the safety of crews, the vessel and the environment and ensuring that tasks are allocated to qualified personnel. It should be noted that the ISM Code does not provide a precise description of the term qualified personnel. Instead this is described in the STCW Convention.²²

A number of additional certificates and permits from the chemical industry are required for the operation of chemical tankers. Without these certificates, no chemicals may be transported by seagoing ship. At the moment of the accident, the Chemical Marketer satisfied all these conditions.

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 notifying any shortfalls. This is assessed by the ship manager by means of internal audits undertaken on board the ships.

²⁰ GT= Gross Tonnage

²¹ 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.

²² International IMO Convention on the standards of training, certification and watch duty for seafarers.



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