



# Grounding of M/V Timca (NL) off Rauma on 16 February 2021



M2021-01

## FOREWORD

Under section 2 of the Safety Investigation Act (525/2011), the Safety Investigation Authority, Finland, decided to initiate an investigation into the bottom touching of M/V<sup>1</sup> Timca (NL) in the Rauma 12 M channel on the northern side of Rihtniemi early in the morning of 16 February 2021. M/V Timca ran over ground, resulting in the flooding of several compartments, but it was able to continue its journey under its own power to the Port of Rauma, where it berthed with assistance from a tugboat. The salvage of the vessel continued in the port, led by the Satakunta Rescue Department. The incident did not cause any personal injuries or environmental damage. All times presented in this investigation report are local time (UTC+2).

The purpose of a safety investigation is to improve public safety, prevent accidents and hazardous situations and limit the damage caused by accidents. A safety investigation is not conducted in order to attribute legal liability.

Captain Tapani Salmenhaara, Master of Science (Technology), was appointed as the Head of the Investigation Team, and Captain Sami Raappana, Hannu Martikainen, Bachelor of Engineering, as well as warrant officer, ret. Jari Alanen and Captain Meeri Tengström were appointed as members. Chief Safety Investigator Risto Haimila was the Investigator-in-charge.

A safety investigation examines the course of events, the causes and consequences of the events, the search and rescue actions performed, as well as the actions taken by the authorities. In particular, the investigation determines whether sufficient attention was paid to safety during the activities that led to the accident as well as in the design, manufacture, construction and use of the devices and structures that caused the accident or hazard or were subjected to it. In addition, it is determined whether the management, monitoring and inspection activities were organised and carried out appropriately. If necessary, possible deficiencies in the rules and regulations concerning safety and the authorities must also be investigated.

The investigation report includes an account of the course of the accident, the factors leading to the accident and its consequences, as well as safety recommendations addressed to the appropriate authorities and other instances regarding measures that are necessary in order to promote general safety, to prevent further accidents and dangerous situations, to prevent damage, and to improve the effectiveness of the operations of search and rescue and other authorities.

An opportunity to issue a statement on the draft investigation report was reserved for those involved in the accident as well as the authorities in charge of monitoring the sector, in which the accident under investigation occurred. Their statements were taken into account when finalising the investigation report. There is a summary of the statements at the end of the investigation report. In accordance with the Safety Investigation Act, statements by private individuals are not published.

The investigation report and the summary have been translated into Swedish and English by Semantix

The investigation report and the summary were published on 26.1.2022 on the website of the Safety Investigation Authority, Finland, at the address [www.turvallisuustutkinta.fi](http://www.turvallisuustutkinta.fi).

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<sup>1</sup> M/V, Motor Vessel

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# 1. EVENTS

## 1.1 Course of events

The combined container and ro-ro vessel (conro) M/V Timca (NL) ran over ground, resulting in flooding of several compartments, on the northern side of Rihtniemi off Rauma early in the morning of 16 February 2021. The vessel had a crew with 19 members.

The vessel left Hanko on 15 February 2021 at 17:05 (Finnish time<sup>2</sup>) with the Port of Rauma as its destination. The vessel was carrying 5,000 tonnes of cargo. At the time of departure, the draught was 7.2 metres at the stern and 6.4 metres at the bow. The direction of the wind was from North-West, and its speed varied between 5–13 m/s.

The second officer took the watch at 24:00. He navigated the ship from the starboard manoeuvring station using an ECDIS device<sup>3</sup>. The X band<sup>4</sup> radar placed on the radar mast was connected to the device.

The second officer called the master at 05:00 and switched on the bow mast X band radar at 05:11. The master arrived at the bridge at 05:15. At 05:20, the vessel turned towards the direction 090°. The master asked the second officer to turn the vessel to the course 110° at 05:25. At that time, the speed of the vessel was 18,6 knots (approximately 34 km/h). The vessel was proceeding in open water while the wind came from the stern.

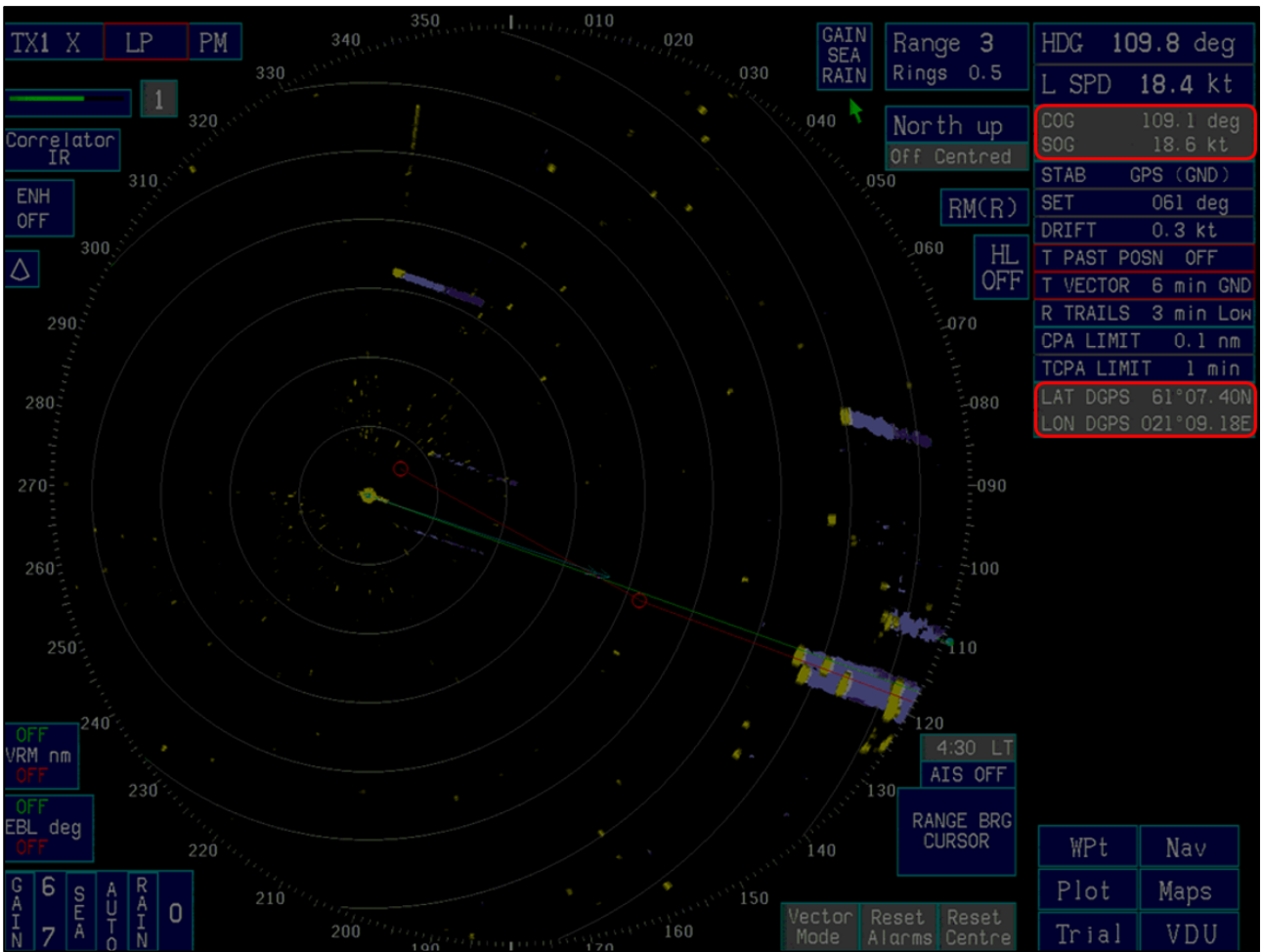
The master took charge of steering upon arrival at the pilot boarding area and started piloting based on the Pilotage Exemption Certificate at 05:30. The master navigated the vessel from the portside manoeuvring station. Because the master had a Pilotage Exemption Certificate for the Rauma 12 M channel, there was no local pilot on board. The Pilotage Exemption Certificate had been granted to the master on 11 September 2020. The master was navigating and piloting the vessel alone, which was the normal mode of operation in a corresponding situation. The vessel required larger rudder angles to steer than expected. The master interpreted the disturbances in the radar image as being caused by an ice field. All equipment on the vessel worked correctly. The radar was adjusted to echo trail mode when the vessel arrived in the archipelago from the open sea.

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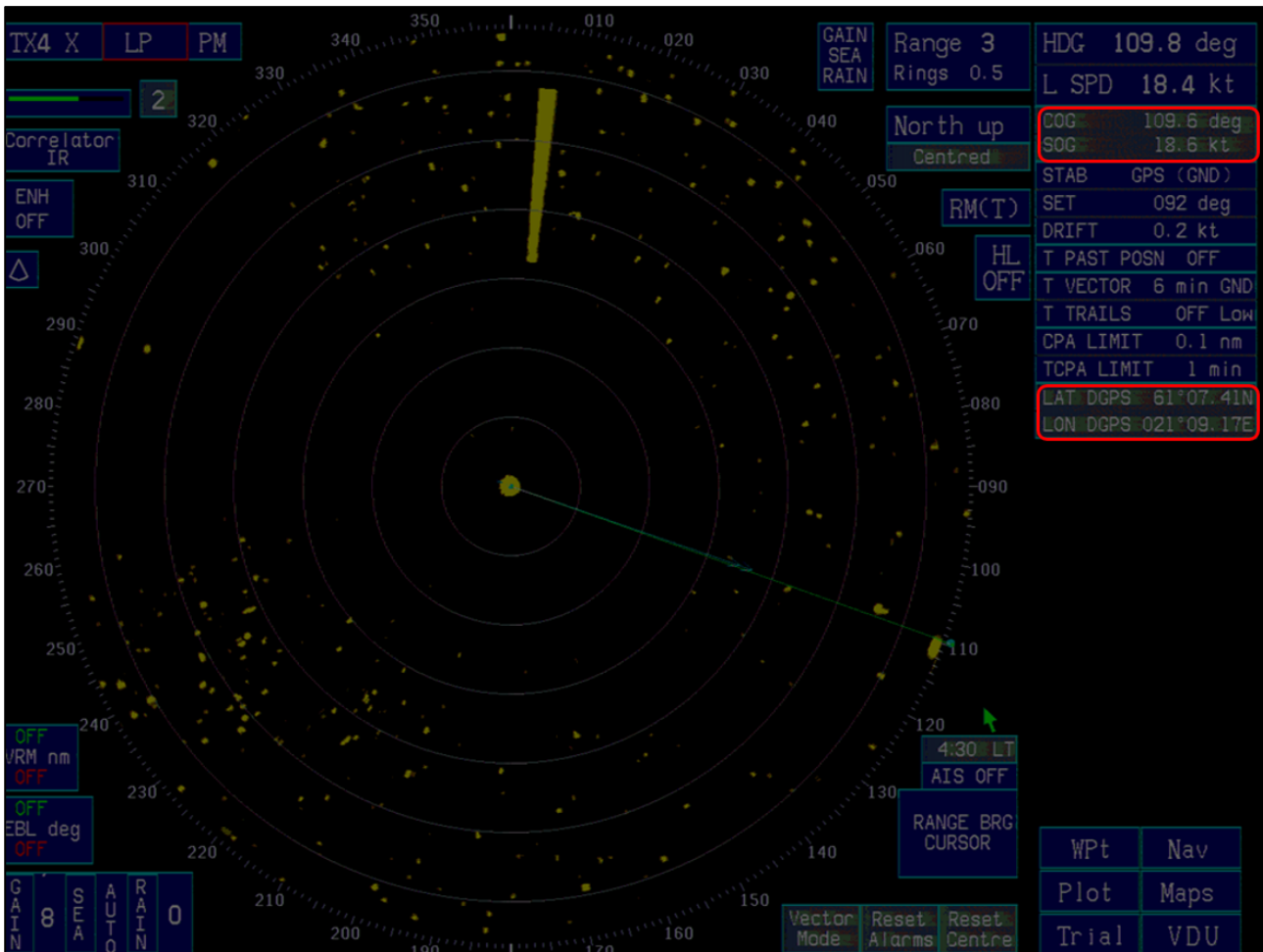
<sup>2</sup> All times are in Finnish time (UTC +2)

<sup>3</sup> ECDIS – Electronic Chart Display and Information System. ECDIS is a type approved chart device.

<sup>4</sup> A navigation radar with a transmission wavelength of three centimetres.



**Picture 1.** Quality of the radar image on the starboard manoeuvring station display when approaching the pilot boarding area at approximately 05:30. A trail caused by the Trail mode function can be seen in the image. No echoes caused by an ice field can be seen in the image. (Source: VDR recording, notes: SIA).

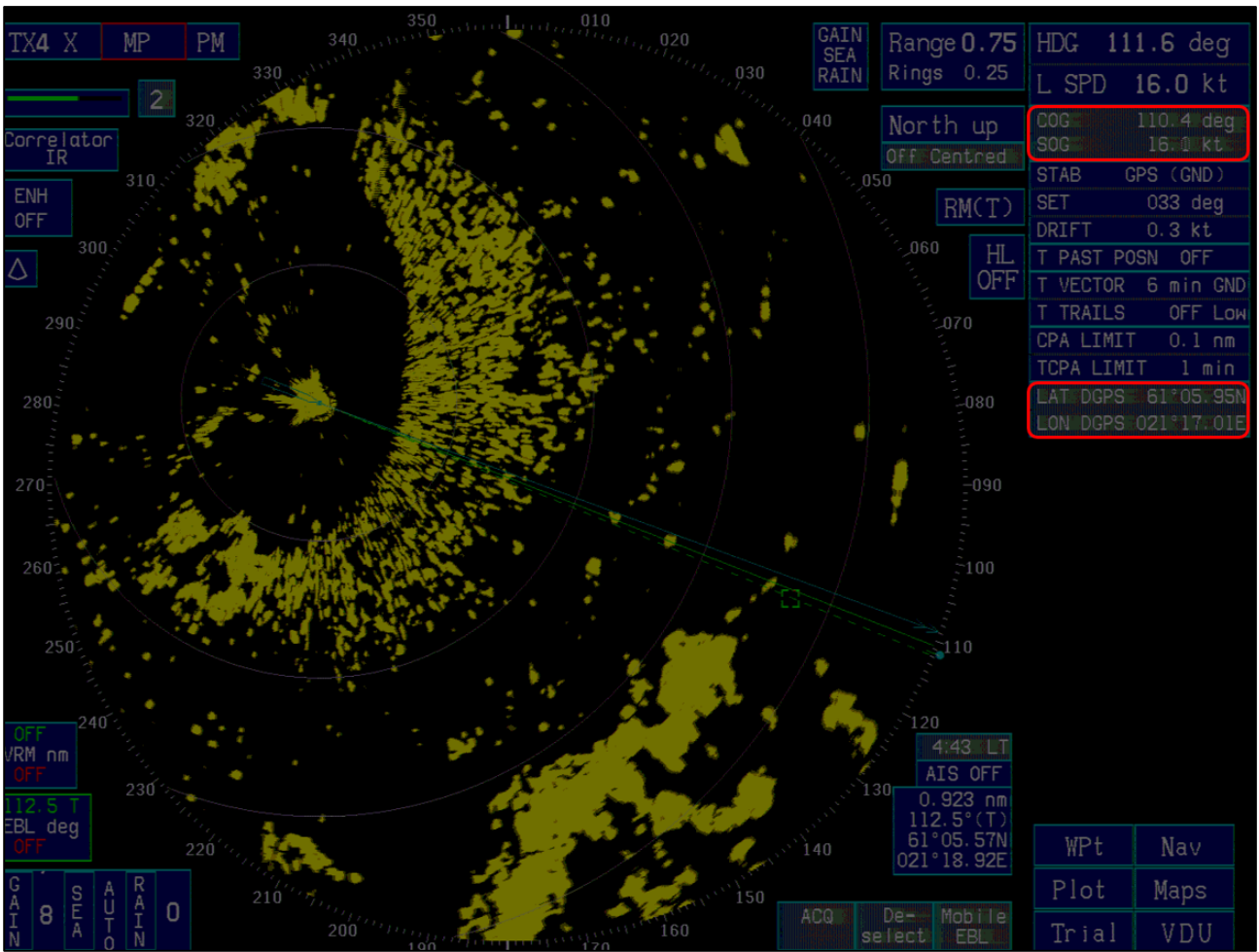


**Picture 2.** Radar image on the port side manoeuvring station display when approaching the pilot boarding area at approximately 05:30. There is no trail caused by the Trail mode function in the image. (Source: VDR recording, notes: SIA).

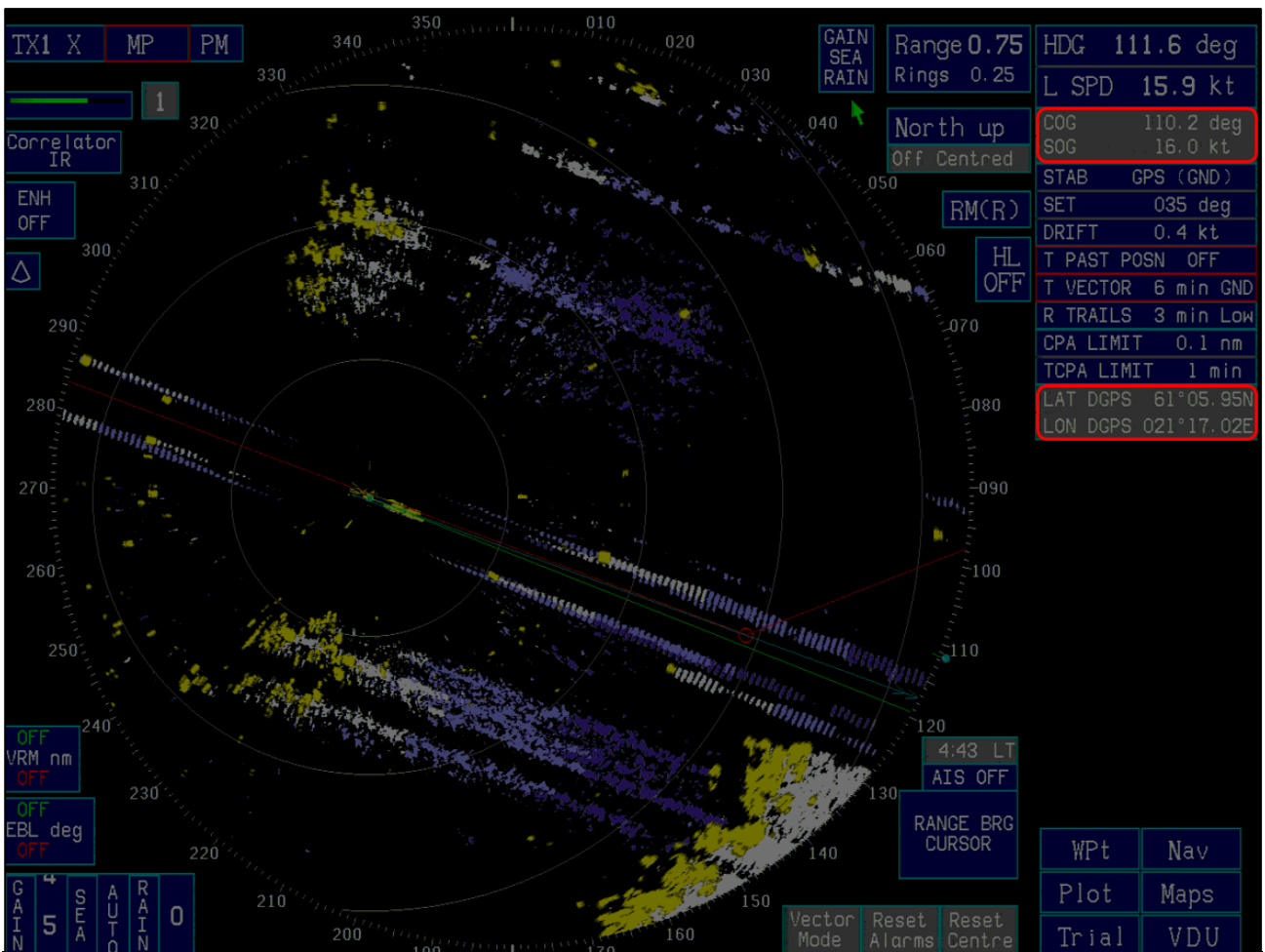
The vessel arrived in Rihtniemi longitude at 05:44, reaching the area of ice. The vessel was transferred to manual steering. The deckhand who was acting as a helmsman steered the vessel according to the master's commands. The speed of the vessel at the time was approximately 16 knots (approximately 30 km/h).

Image 3 below shows the port side manoeuvring station radar display while approaching the edge of the ice north of Rihtniemi.



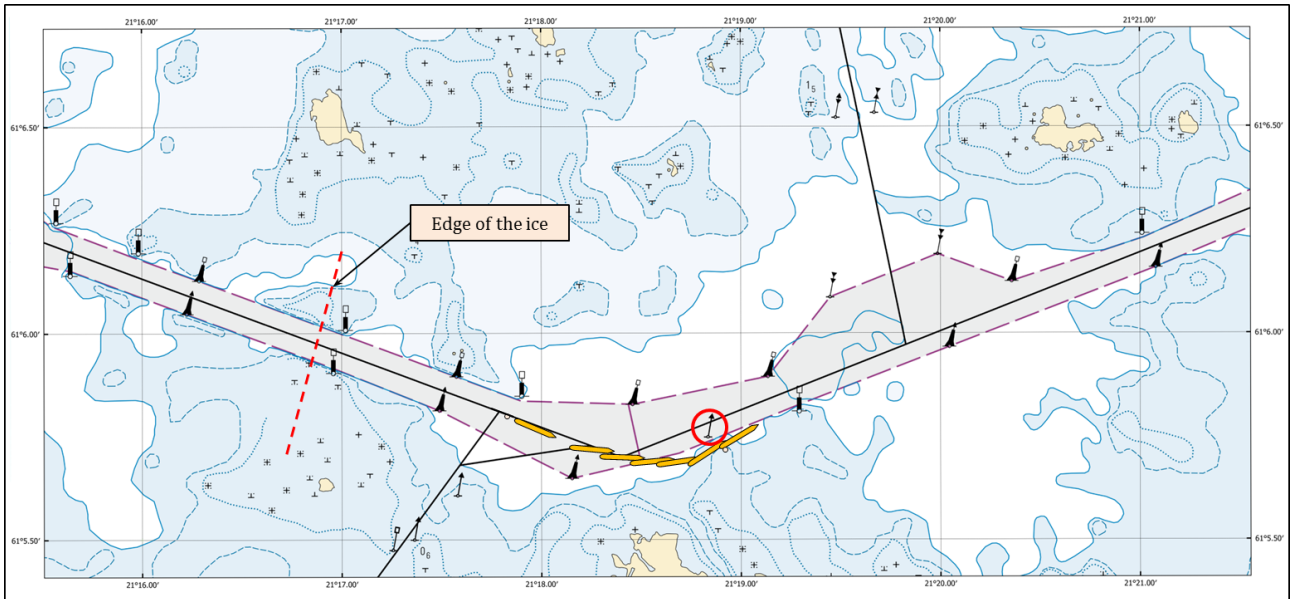


**Picture 3.** Radar image on the port side manoeuvring station display when arriving at the edge of the ice at 05:43:58. The image shows that the echoes from the surrounding area are extremely strong due to the display settings (gain). (Source: VDR recording, notes: SIA).



**Picture 4.** Quality of the radar image on the starboard manoeuvring station display, operated by the 2nd officer, when the vessel arrived at the edge of the ice at 05:43:58. The image shows a large amount of trail caused by the Trail mode function on, which was interpreted as a disturbance. (Source: VDR recording, notes: SIA).

Due to the disturbances on the radar display, it could not be properly used for navigation, at which time the master decided to proceed with the means of optical navigation. When approaching the way point marked as the turning point, the master started to turn the vessel towards the new direction (TS 069°) at 05:46 giving the helmsman the command "PORT TEN". The vessel turned slowly and drifted to the right. A few moments later, the vessel was outside of the fairway area and ran over ground. The grounding caused the flooding of several compartments and damages to the vessel.



**Picture 5.** Passage of the vessel away from the fairway area towards the shallows shown on the map image, with the edge of the ice field marked with a red dashed line. The temporary "TIMCA" buoy in the red circle was established after the accident. (Map: Traficom, notes: SIA)

At 05:48, the master felt the vessel touch the bottom and vibrate strongly, at which point the master reduced speed immediately. The crew started to gather on the bridge. At the same time the master gave an alarm "ABANDON SHIP". The crew prepared a lifeboat for launch.

The master was only notified about flooding in the engine room after he had increased speed to proceed into port as quickly as possible.

Because the water inflow was fairly quick, the engine compartment crew took measures to stabilise the vessel. The engine compartment personnel went to assist the 2nd engineer with the pumping arrangements to control the flood. The ballast tanks were empty at the time of the accident.

While the master was navigating the vessel to port, the engine room crew managed to control the rise of water level. However, the chief engineer notified the master that the flooding water prevented the use of the bow thrusters, because the shaft generators that powered them were at risk of being damaged because of the rising water level. This could have caused a serious malfunction because the shaft generators were powering the bow thrusters.

## 1.2 Alarms and rescue activities

When the vessel drifted outside the fairway area during a turn, it hit the ground at 05:48. After the occurrence the master reduced speed and gave the "ABANDON SHIP" alarm. The master contacted the engine room and was informed that the vessel had sustained floods in several compartments below waterline, including the engine room. The floods were reported to be severe. Water was flooding into the vessel at high volumes. Stabilising measures were initiated by moving water into the vessel's ballast tanks to control and limit the trim and list of the vessel. After the grounding the portside ballast tanks four and five started to fill up. Only later it was discovered that the starboard ones were flooding as well.

When the accident occurred, the vessel's chief engineer was in the cabin and felt the vessel shake violently. The alarms activated at the same time. The chief engineer's cabin contains

remote terminals of the engine alarms. When hearing the “ABANDON SHIP” alarm the chief engineer went immediately to the bridge to find out what had happened. After being informed about the serious damage by the master, the chief engineer first went to the cabin to get survival equipment and then to the engine room. When the accident occurred, the 2nd engineer was on watch.

Draining the damaged areas started by using the bilge and ballast pumps. It was possible to reduce the rise of the water level, but not stopped completely. Due to the rising water level, bilge water level alarms from the pipe tunnel and several other compartments were activated. Because the water level kept rising, a spray pump driven ejector was also used to pump out the flooding water. The measures carried out were successful in stopping the rise of the water level and even lowering it a little. This ensured that continuing the passage to the port was possible.

The chief engineer kept the master informed about the situation. The chief engineer also reported that it would not be possible to use the bow thrusters, because there was a risk of the shaft generator damage due to the flooding water. This would cause a severe malfunction in the electrical power supply to the bow thrusters.

After berthing alongside the main engines were stopped and the drainage continued.

At 06:23, the officer on-duty at Alfons Håkans Oy Ab in Rauma notified the master of the tugboat Neptun that M/V Timca had been run over ground and needed berthing assistance. M/V Timca was already at the port close to the berth when the master of Neptun contacted M/V Timca to find out what kind of assistance was needed. In addition to tugboat assistance, M/V Timca needed and got mobile drainage pumps with hoses. Because the operating voltages of the vessels were different, the electricity required by the pumps was supplied with cables from the tugboat.

Satakunta Rescue Department was notified about the accident of M/V Timca by the Maritime Rescue Coordination Centre Turku at 06:30. The Rescue Department alarmed the 1st rescue unit (pump crew) to the port to check and specify the need for assistance. At 6:47, the leader of the rescue unit reported that water was flooding into the vessel, and the equipment of the Rescue Department could not be used to empty the vessel because the pumps could not be brought on board. After this, nine more rescue units (a second pump crew and eight pump units) and their personnel were sent to the emergency task.

At 07:10, the Maritime Rescue Coordination Centre Turku stated that the responsibility of the salvage operations was transferred to the Rescue Department because the vessel was berthed.

The Rescue Department prepared for the accident comprehensively because the vessel involved in the accident was known to be severely damaged, and there was also a risk of an oil spill. The Rescue Department discovered the possibility of an oil spill at 09:45 and prepared to set booms around the vessel. Tugboat Jupiter of Alfons Håkans Oy Ab from Pori was called in for booming, because the tugboat Neptun that was still supplying power for the drainage pumps on board M/V Timca. The tugboat Jupiter arrived at the scene at 13:44 and set an oil boom around M/V Timca. The booming was completed by 14:20.

The Maritime Rescue Coordination Centre Turku was notified of the accident via West Coast VTS at 05:49 and the maritime rescue task was recorded as completed with regard to the Maritime Rescue Coordination Centre at 13:39.

The vessel did not notify the Maritime Rescue Coordination Centre about the accident; the Centre discovered that the vessel was already approaching the port area when they were informed about the accident.

The Coast Guard did not participate in the rescue operation, but it conducted a survey in the area to detect any potential oil spills. In addition, the Coast Guard performed alcohol tests for the crew on duty during the accident. The results were negative.

### **1.3 Consequences**

The accident caused damages only to the vessel. The damages of the vessel were inspected at the Port of Rauma. According to the damage inspection report, the vessel sustained severe damages in several compartments throughout the hull. The vessel also sustained serious damages in different parts of the engine room as well as the pipe tunnel. In addition, there were floods in the engine room and the ballast tanks 4 and 5 in the double bottom.

The ruptures in the hull were the largest midship, up to 20–50 cm wide. In addition, there were dents and scratches over the whole vessel bottom. The ruptures caused significant floods in different compartments of the vessel.

Both propellers on M/V Timca were damaged, and dents and scratches were found in both rudders as well as the skegs<sup>5</sup>. The tips of two propeller blades were broken.

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<sup>5</sup> A skeg refers to a fixed structure on the hull of a vessel that supports the vessel's rudder equipment.

## 2 BACKGROUND

### 2.1 Operating environment, equipment and systems

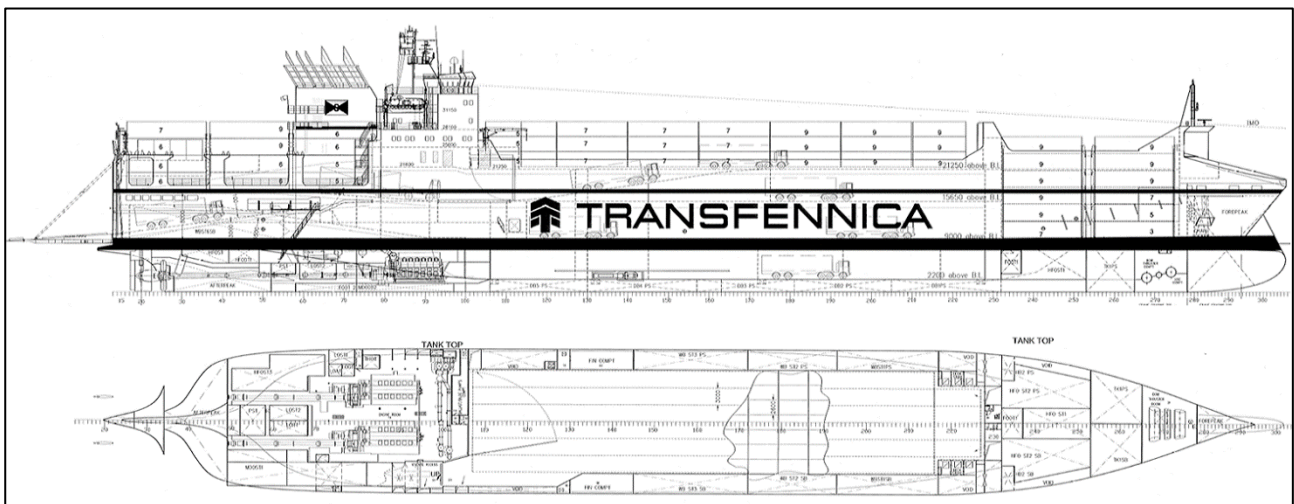
#### 2.1.1 M/V Timca

M/V Timca (IMO: 9307358) is a conro vessel<sup>6</sup> sailing under the Dutch flag. The vessel is managed by the Dutch shipping company Spliethoff. Timca was built on the Stocznia Szczecińska Nowa shipyard in Szczecin, Poland, in 2006. The vessel's port of registry is Amsterdam. Timca is classified in the Lloyds Register class +100 A1, and its ice class is 1A Super. The gross tonnage (GT) of the vessel is 28,301 and its deadweight is 17,400 dwt. The vessel has 2,800 lane metres and its container capacity is 640 TEU. The vessel had not been certified as an ECDIS vessel.

The total length of the vessel is 205 m, its width is 25.5 m and its maximum draught is 8.5 m. The vessel reaches a maximum speed of 22 knots with an engine power of 25,200 kW (2 x 12,600 kW, Wärtsilä 12V46C, 500rpm). The vessel is equipped with two propellers and Wärtsilä Efficiency rudders linked to the propellers. The maximum rudder angle is 35 degrees, and the turning time from side to side with two pumps is 12 seconds.

The production of electricity on the vessel has been implemented with two Wärtsilä 8L20C/A. Van Kaick 1615kVA diesel-alternators as well as two A. Van Kaick 2125kVA shaft generators connected to the Renk reduction gears on the main engines.

The vessel has two bow thrusters (2 x 850 kW), powered by generators connected to the main engines. The bow thrusters can provide a turning speed of 20°/min for the vessel.



**Picture 6.** Structural image of the vessel. (Image: Transfennica)

#### 2.1.2 The manning of the vessel

With regard to its crew, the vessel was compliant with the regulations of the flag state at the time of the accident. The vessel had been released from the obligation to use a pilot, because the ship's master had a Pilotage Exemption Certificate granted by the Finnish Transport and Communications Agency Traficom for the Rauma 12 M channel.

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<sup>6</sup> A combined container and ro-ro vessel. The inner decks are loaded with the roll on-roll off methods, while containers are loaded on the weather deck with a crane.

**Master.** The Dutch master of the vessel had worked for the company since 2005, on the type of vessel in question since 2008 both as a deck officer and as a master since 2017. The master had completed the ECDIS system type training in 2010. The master had completed an ice navigation course, but the training had focused on navigation in arctic conditions instead of channel ice navigation in archipelago.

The master has a Pilotage Exemption Certificate for the Kotka, Hanko and Rauma channels. The master had navigated the Rauma 12 M channel at least 20 times guided by a pilot. The master had also completed a Pilotage Exemption Certificate examination for the Rauma channel, but had not completed a simulator test for it. A simulator test was not a requirement for receiving a Pilotage Exemption Certificate for the channel in question. The Pilotage Exemption Certificate had been granted to the master on 11 September 2020. The master had navigated the channel in questions several times as an officer and as a master with a pilot. This was the fifth passage as a master with a Pilotage Exemption Certificate and the first time navigating the Rauma 12 M channel in ice conditions.

**The second officer** had served on the vessel for approximately two weeks. The second officer had served on the shipping company's other vessels of the same type for more than five years.

The second officer and the master knew each other, because serving together on the same vessels earlier. They had previously navigated the Rauma 12 M channel together only once. The second officer had a first officer's qualification granted on 21 October 2020. He had received ECDIS type training in 2017. The second officer had been working in his position of since 2019. The second officer did not have any special training for navigation in an archipelago or in ice conditions.

**The chief engineer of the vessel** was experienced and certified as a chief engineer. The vessel had **three** engineers with the qualifications required by the vessel's minimum safe manning document.

### **2.1.3 Bridge and equipment**

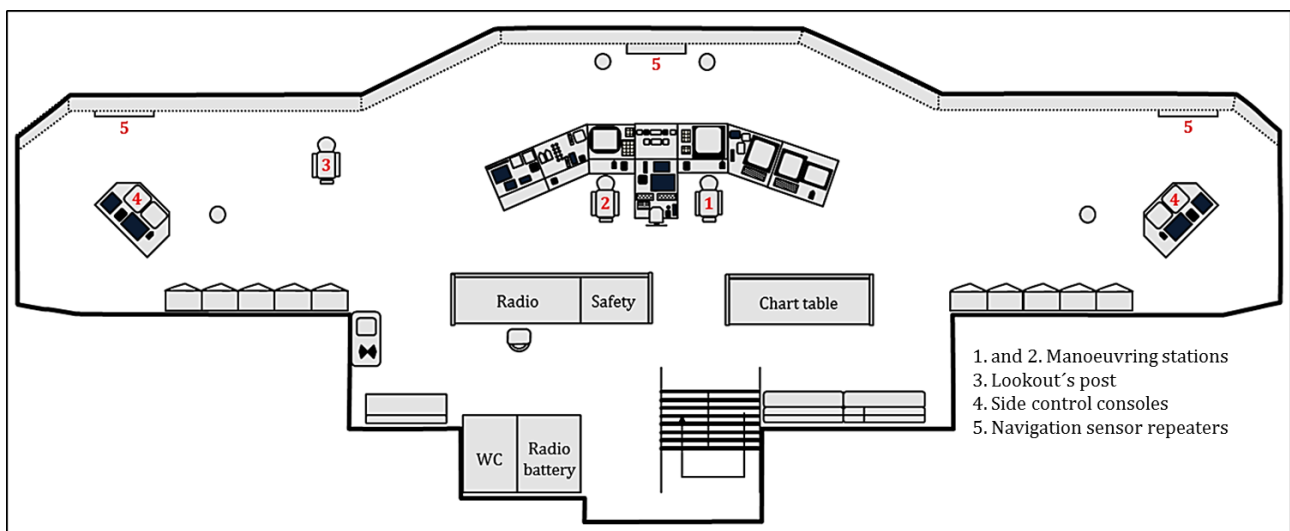
The bridge of the vessel is approximately 27 metres above the waterline. Its open general layout enables good visibility to the front, sides and back.





**Picture 7.** Workstations on the bridge, with a helm in the central console for manual steering.  
(Image: SIA)

The front console on the bridge has two workstations (1, 2), both of which have control units for the vessel's steering and navigation sensors as well as the communications system. The Manoeuvring station on the starboard side is the primary station for the officer of the watch. The master piloted the vessel on the port side manoeuvring station.



**Picture 8.** Overall layout of M/V Timca's bridge. The image shows the locations of the control devices on the bridge and the manoeuvring stations 1 and 2. (Image: SIA)



The post of the lookout (3) is separate from the control consoles. The side control consoles (4) also have the control devices necessary for steering the vessel. There is an open passage on the bow side, and the displays of the navigation sensors are located in the ceiling consoles (5).



**Picture 9.** Ceiling console displays, a separate heading display, panoramic rudder angle displays. (Image: SIA)

The propulsion and steering control devices are placed in the central console shared by both workstations so that they can be reached while sitting at a workstation.



**Picture 10.** The image shows the control devices for the vessel's steering and machinery. (Image: SIA)

There is a separate chart table and navigation area at the back of the bridge on the right side. On the port side behind the manoeuvring stations, there are the vessel's radio station and safety console.



**Picture 11.** The vessel's GMDSS radio station. (Image: SIA)

#### 2.1.4 Navigation and communication equipment

The vessel had navigation and communication equipment in accordance with the IMO requirements; they are listed in the table below.

**Taulukko 1.** Navigation and communication equipment of the vessel.

| <b>Device</b>         | <b>Manufacturer</b> | <b>Type</b>        |
|-----------------------|---------------------|--------------------|
| Radar, X band         | Kelvin Hughes       | CAE-A25            |
| Radar, X band         | Kelvin Hughes       | CAE-A25            |
| Radar, S band         | Kelvin Hughes       | LPA-A1             |
| ARPA display          | Kelvin Hughes       | Manta 2300A        |
| Gyroscopic compass    | Sperry Marine       | Navigat X          |
| Main repeater         | Sperry Marine       | 4881AA             |
| Repeater              | Sperry Marine       | 4622-AB            |
| Main repeater         | Sperry Marine       | 74883              |
| Direction-finder 360° | Sperry Marine       |                    |
| Mg compass            | Sperry Marine       | Navipol            |
| Speed log             | Furuno              | DS 80              |
| Depth-finder          | Furuno              | FE 700             |
| GPS                   | Furuno              | GP-170             |
| GPS                   | Furuno              | GP-170             |
| ECDIS                 | Transas             | Navisailor 4000    |
| ECS                   | ChartWorld          | Surface Pro tablet |
| Autopilot             | Sperry Marine       | Navipilot V HSC    |
| BNWAS                 | CSI                 | BNWAS              |
| VDR                   | Kelvin & Hughes     | NDR 2002           |
| SSAS                  | Thrane & Thrane     | TT 3000 SSA        |

### 2.1.5 Recording equipment

The vessel uses VDR equipment that is compliant with the requirements and was in working order at the time of the incident.

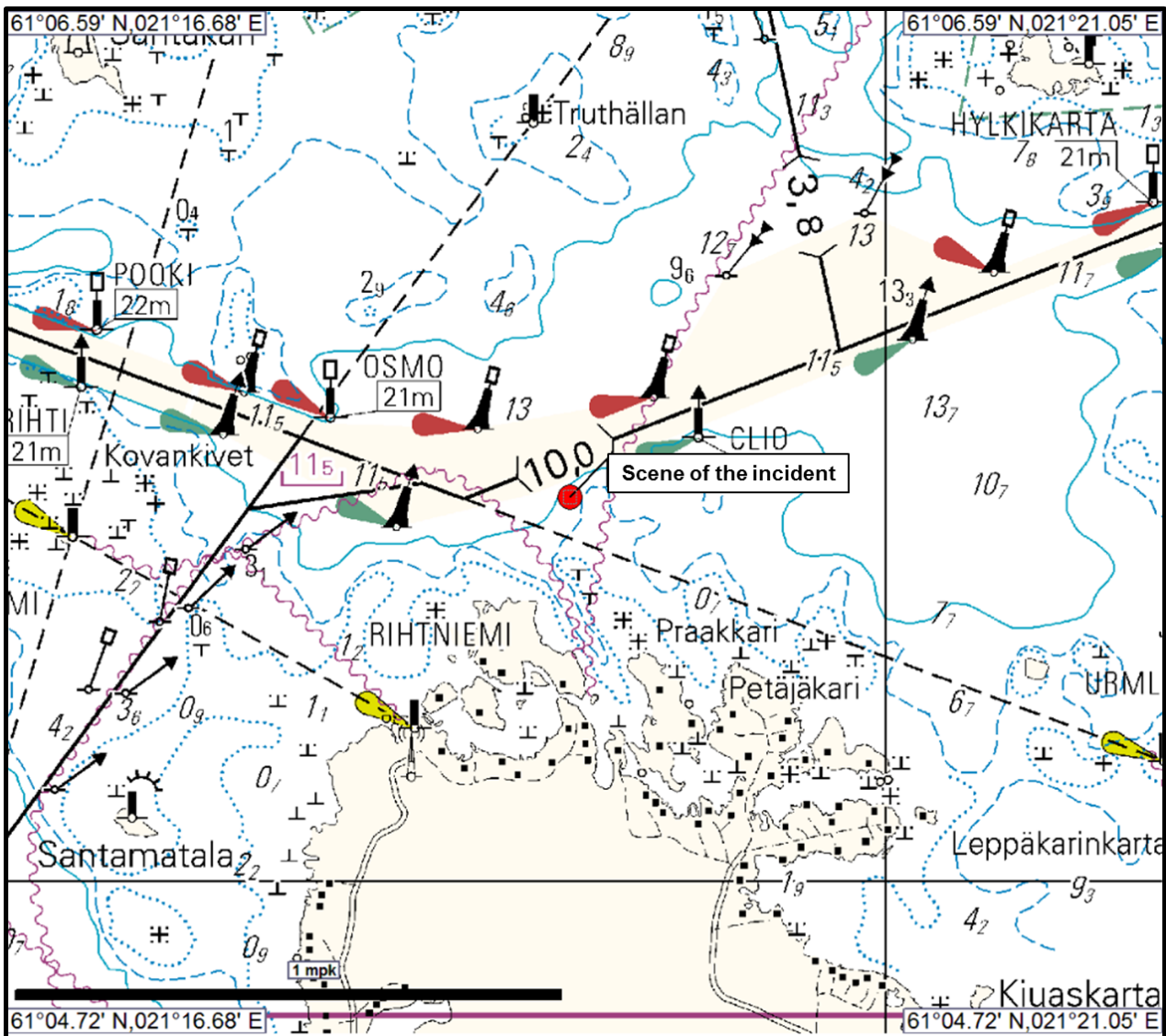
**Taulukko 2.** GMDSS and other external communication devices.

| Device          | Manufacturer         | Type            |
|-----------------|----------------------|-----------------|
| VHF+DSC         | Furuno               | FM-8900S        |
| Navtex          | Furuno               | NX 700          |
| EPIRB           | Jotron               | Tron 60S        |
| Lifeboat VHF    | SAIT - Radio Holland | GMDSS portable  |
| VHF ATEX / FiFi | Thrane & Thrane      | SP 3530         |
| SART            | JOTRON               | Tron SART 9 GHz |
| MF/HF + TOR     | JRC                  | JSS 2150 N      |
| MF/HF+DSC+telex | JRC                  | JSS-2250        |
| Inmarsat-C      | SAILOR               | TT-3020/3606    |
| Sat FBB         | Sailor               | Sailor 500      |
| VSAT            | Sailor               | Sailor V900     |

### 2.1.6 Rauma 12 M channel

The Rauma 12 M channel used by M/V Timca begins on the west side of the Rauma lighthouse and leads to the Port of Rauma. The channel is lit, it is 14 nautical miles in length, and it has been marked with lateral marks. It is a class 1 (VL 1) channel, which refers to a channel constructed and maintained primarily for use in merchant shipping. The dimensions and geometry of the vessel meet the minimum dimensions in accordance with the instructions for navigation channel design. The channel can be used in all conditions of visibility and in winter traffic with ice-strengthened vessels or with icebreaking assistance.

The design ship used in the Rauma 12 M channel is a 255-metre-long RoRo vessel with a draught of 12 metres. The safe clearance depth is 14.1 metres in the outer parts of the channel and 13.6 metres towards the port from the Rihtniemi turning point. The design speed in the outer parts of the channel is 12 knots (22 km/h) and 10 knots in its inner parts (18.5 km/h). M/V Timca is smaller than the design ship, and the weather conditions at the time of the accident did not exceed the recommended limits for the channel's navigation conditions.



**Picture 12.** Waypoint in the Rauma 12 M channel on the northern side of Rihtniemi. (Image: Finnish Transport Infrastructure Agency, notes on the image: MRCC Turku).

**Navigability of the channel.** According to the fairway card, the outer parts of the channel until Rihtniemi are in the open sea and without protection from wind from the south, west or north. After Rihtniemi, the channel continues as a narrow and channel protected by rocks, islands and the mainland with closely set edge marks to the Port of Rauma. In the Kovankivet narrows on the Urmluoto line, there may be cross-currents that make the steering of large vessels more difficult. Strong side winds also increase the drift. In the winter, ice fields move on the channel in the area between Hylkikartta and Rihtniemi. As the ice moves, buoys may have sunk under the ice and their light fixtures may have been damaged.

The lights on the Rauma 12 M channel have been replaced. Remote control of the safety equipment on the Rauma 12 M channel was deployed in November 2017. Vessels were notified of the service in the Master's Guide updated on 1 November 2019.

Daylight sensors automatically turn the safety equipment lights on and off. The functioning of the light-sensitive switch can be bypassed with the remote control, meaning that the lights can also be turned on manually when needed. The light equipment power adjustment can be carried out on an individual safety device, selected device or all safety devices on the channel in question. The luminosity adjustment range is 5–100% of the maximum; the adjustment is made for the time period necessary, after which the luminosity returns to its normal set value (default luminosity) that provides the nominal range stated in the List of lights. The luminosity of safety equipment (edge mark, buoys, and line lights) can be adjusted from the base level (40% luminosity) up to 100% on the vessel's request by the VTS, the pilot or the Coast Guard, if necessary.

## **2.2 Circumstances**

### **2.2.1 Weather and ice conditions**

At the time of the accident, the weather in Kylmäpihlaja was clear, with good visibility (30 km) and an air temperature of  $-0.5\text{ }^{\circ}\text{C}$ . The wind speed was 8.4 m/s from the direction  $319^{\circ}$  (North-West). The sea level was  $-23\text{ cm}$  below the mean sea level and the temperature was  $0\text{ }^{\circ}\text{C}$ . In the accident site there was new ice less than 5 cm thick and floating ice about 15 cm thick.





**Picture 13.** Ice situation off Rauma after the accident on 16 February 2021. The area of the accident is marked with a red circle. (Image: TARKKA service by the Finnish Environment Institute (SYKE), notes: SIA)

### 2.2.2 Vessel's voyage plan

A voyage plan must always be drawn up for a vessel's sea voyage. Flag state and shipping company-specific regulations apply to its content. On an international level, voyage planning has been provided for in Chapter V of the SOLAS Convention<sup>7</sup>, Section A, Chapter VIII/2 of the STCW Convention<sup>8</sup> as well as the IMO Resolution A.893(21) – Guidelines for Voyage Planning.

On a Finnish vessel, the regulations on voyage planning are based on the Act on Ships' Crews and the Safety Management of Ships (1687/2009). In accordance with the act, the Finnish Transport and Communications Agency (Traficom<sup>9</sup>) is obliged to issue more detailed regulations on watchkeeping and voyage planning in order to implement the STCW Convention. The Finnish Transport and Communications Agency Traficom also issues more

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<sup>7</sup> International Convention for the Safety of Life at Sea (SOLAS), 1974

<sup>8</sup> International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW), 1978, as well as its amendments.

<sup>9</sup> Traficom was established on 1 January 2019, and it continues the duties of its predecessor Trafi with regard to issues such as navigation regulations.

detailed regulations on watchkeeping and voyage planning for vessels that do not fall within the scope of the STCW Convention (1687/2009, section 23(3)).

The Finnish Transport and Communications Agency Traficom has given more detailed instructions on the voyage planning of vessels in regulation TRAFI/12134/03.04.01.00/2011, issued on 26 September 2011, which is valid until further notice. According to the regulation, a voyage plan must be provided from the port of departure to the first port of call. In addition, the voyage plan must include the sections of the voyage with pilotage. According to Traficom's regulation, speed limits and ice conditions must also be taken into account in the voyage planning. A contingency plan must be included in the voyage plan. It includes an outline of the route options to safe anchorages or shelter harbours in case the vessel cannot follow the planned route due to an emergency or some other reason.

The regulation only mentions the voyage planning of piloted voyages separately to state that the voyage must be planned so that the officer of the watch can easily monitor the pilot's activities.

The Finnish Transport and Communications Agency Traficom also specifies matters related to voyage planning in connection with the pilot examination and practical pilotage assessment (TRAFI /57228/03.04.01.00/2015). The voyage plan can be presented either in writing or electronically. As applicable, the Finnish Transport Safety Agency Trafi regulation on the voyage planning of vessels (TRAFI/12134/03.04.01.00/2011) must be followed in drawing up a voyage plan, and it must take the applicable parts of matters referred to in sections 2.1.1–2.1.4 of the regulation into account.

A blank chart test and drawing up a voyage plan are required in connection with the pilot examination. They are used to determine the applicant's knowledge of the channel. In addition, the written examination includes questions about the conditions in the channel concerned, traffic, VTS, the icebreaking service and port conditions and about the Pilotage Act and the provisions issued under it and the Vessel Traffic Service Act. The aim of this is to ensure that a person with a Pilotage Exemption Certificate is also familiar with the requirements of Finnish law.

A test conducted in a ship simulator is intended to assess the candidate's capability to navigate the ship optically and by means of radar in accordance with the voyage plan he or she has compiled; capability to handle and steer the ship in the channel and the port that the test concerns; capability to react adequately to meeting or transverse traffic; capability to liaise with the bridge team, other ships and the VTS, and the capability to act in emergencies (986/2018, section 11a).

The vessel's shipping company has included instructions that comply with the national and international regulations in the safety management system. The vessel's voyage plan was documented in accordance with the company's instructions and the checklists issued.

The company's instructions did not include detailed instructions on the voyage planning of a vessel while navigating narrow passages. The voyage plan's checklist had been signed by both masters.

Markings required by the company's voyage plan had not been made on the nautical charts used on the vessel, neither the paper nor the electronic version. Timca's voyage plan consisted of a route planned on the electronic nautical chart based on turning points. The turning points were set at the intersections of the navigation lines. The same turning points were also added to the written voyage plan signed by both masters. The route was set to follow the centre line



of the channel. The Rihtniemi turn was planned to follow the right side of the channel in accordance with the leading marks.

The notes on the vessel's charts did not show any instructions or comments related to the turns. The starting points of the turns (Wheel Over Point) or the radius or rate of the turns had not been specified in the voyage plan, and it did not include information required for safe decision-making in pilotage.

## **2.3 Recordings**

### **2.3.1 VTS<sup>10</sup>**

The AIS and radar monitoring-based recordings of the West Coast VTS have been adapted into image presentations to determine the track and motion of the vessel. In addition, a chronological communications table has been drawn up on the VHF traffic between the vessel and the VTS as well as the Maritime Rescue Coordination Centre and the tugboat.

### **2.3.2 VDR<sup>11</sup>**

Image presentations of the radar recordings as well as tables and graphs of the parameter information of different sensors have been extracted and edited from the VDR recording received from the shipping company. The aim has also been to extract the audio recordings from the bridge separately despite the VDR settings, in which the information from three microphones is combined into the same group. This made separating the sound sources of the recordings more difficult. The VHF traffic has been compared to the corresponding information from VTS.

### **2.3.3 The Pronto system**

The rescue activities were investigated with the help of the Pronto system<sup>12</sup>. The Pori Emergency Response Centre received the emergency call at 06:47. During the day, 13 different units participated in the emergency task. The task ended at 21:26.

### **2.3.4 Maritime rescue system**

The Western Finland and The Gulf of Finland Coast Guard districts are responsible for the maritime rescue department's operations in the field. The area of responsibility for maritime rescue activities is divided into two parts: The Western Finland and Gulf of Finland maritime rescue sectors. Each Coast Guard district is responsible for its own sector. The Western Finland Coast Guard has the authority over the maritime rescue activities in the Rauma sea area.

No actual maritime rescue tasks implemented at sea were related to this accident, because the vessel was able to reach the port with its own engines. At the port, the vessel's personnel on watch underwent alcohol checks by the authorities.

There has been a change in the authority for environmental accidents at open sea, such as oil spill prevention and response since the start of 2019. The amendments were included in the Rescue Act (1353/2018, section 27a). As a result of the change in legislation, the authority for preventing environmental damage in open sea was transferred from the Finnish Environment

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<sup>10</sup> Vessel Traffic Service.

<sup>11</sup> VDR (Voyage Data Recorder) is the vessel's black box that records the steering information and audio from the bridge as well as the vessel's technical parameters.

<sup>12</sup> Pronto refers to the resource and accident statistics of the Rescue Department.

Institute (SYKE) in the administrative branch of the Ministry of the Environment to the Finnish Coast Guard in the administrative branch of the Ministry of the Interior.<sup>13</sup> In connection with this accident, the Coast Guard carried out a survey flight in the accident area to detect oil spills, if any. No spills were found.

The regional rescue department had the authority for leading the rescue operations and preventing environmental damage because the accident occurred in traffic area II. The Satakunta Rescue Department initiated the actual rescue operations when M/V Timca berthed at the Port of Rauma.

## **2.4 Persons and organisations related to the accident as well as safety management**

### **2.4.1 Navigating the vessel and bridge teamwork**

At the time of the accident, the master, second officer and deckhand were on the bridge of the vessel.

The master arrived at the bridge at 05:15. When the vessel arrived at the pilotage area at 05:30, the master took command of the vessel and commenced piloting. There is no record of the change of command for steering in the documentation or in the audio recordings. The master had a valid Pilotage Exemption Certificate, granted for the Rauma 12 M channel on 11 September 2020.

At the time of the accident, all of the vessel's navigation equipment functioned normally. The second officer monitored the navigation while the master piloted the vessel. The intended measures and the decisions was not discussed between the bridge personnel. The atmosphere on the bridge was calm as usual. All of those present on the bridge felt relaxed and well rested and fit enough to perform their duties. The second officer did not observe anything abnormal in the pilotage situation, and therefore did not interfere with the master's steering in any way. The second officer did not feel that he would have had any barriers to challenge the master's actions.

**The master navigated the vessel by the means of radar and an electronic nautical chart,** ordering steering commands to the helmsman. The mast radar display was permanently relatively off-centered (OFF-Centered) with a radar echo trail (Trail) on. The trail function made interpreting the radar display more difficult while approaching the planned waypoints. The targets used for navigation mixed partially with the trail echoes.

The video gaining of the bow radar that had been turned on before the master arrived on the bridge. The gain was at level 8 throughout the pilotage, and it was not adjusted while changing the range. It is likely that checking the display settings and adjusting them in connection with the range changes would have improved the readability of the radar image.

According to the master, navigating with the radar became impossible while approaching the edge of the ice, meaning that in practice, it was not possible to use radar to monitor the route and position of the vessel exactly (see Image 4.). Because the visibility was good, the master continued navigating by optical means. Based on the VDR recordings, no significant disturbances caused by the ice field, nor sea state can be detected in the vessel's radar image.

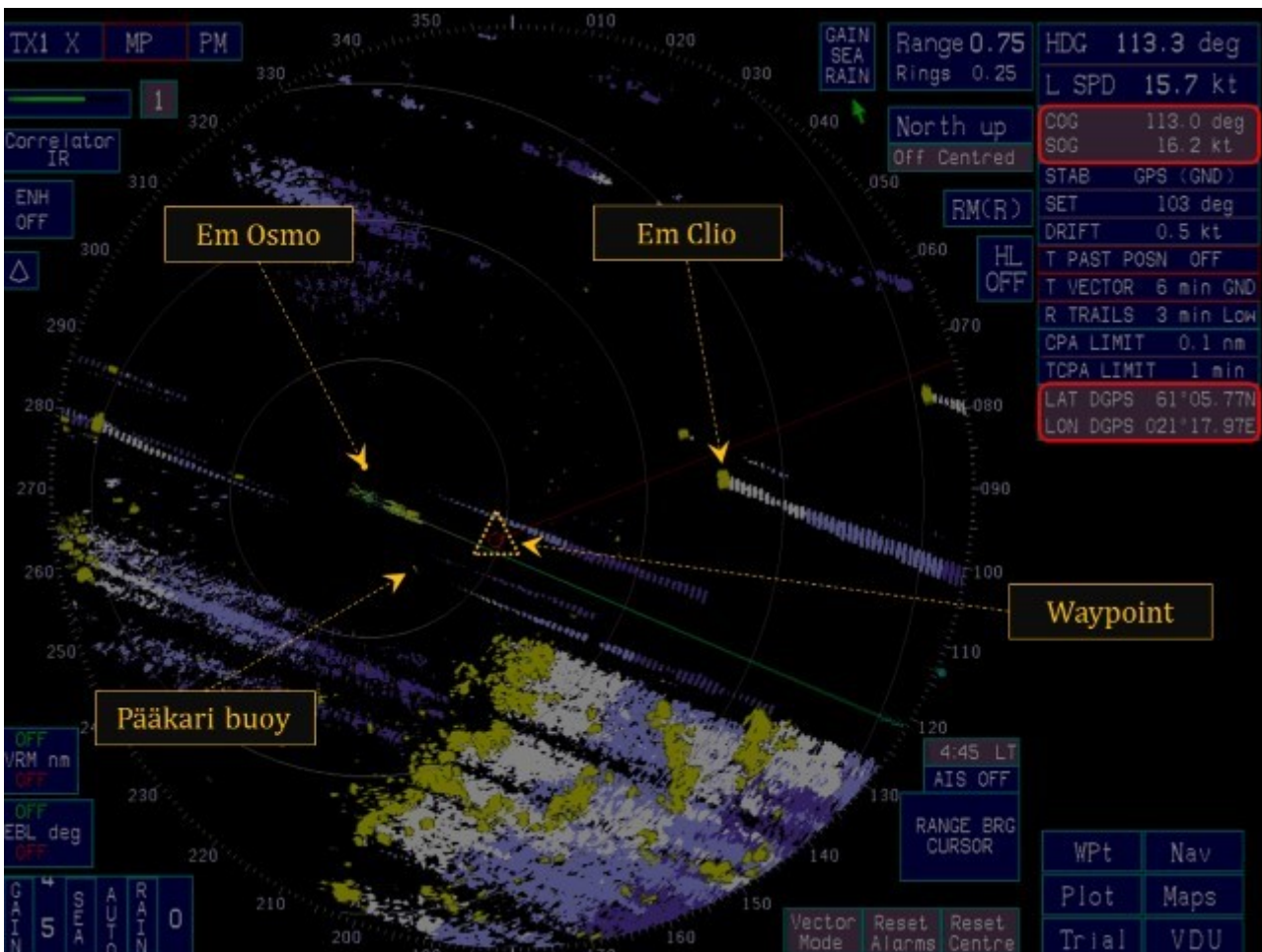
At Rihtniemi, the speed of the vessel had slowed down from its previous 18 knots (approximately 33 km/h) to 16 knots (approximately 30 km/h). According to the fairway

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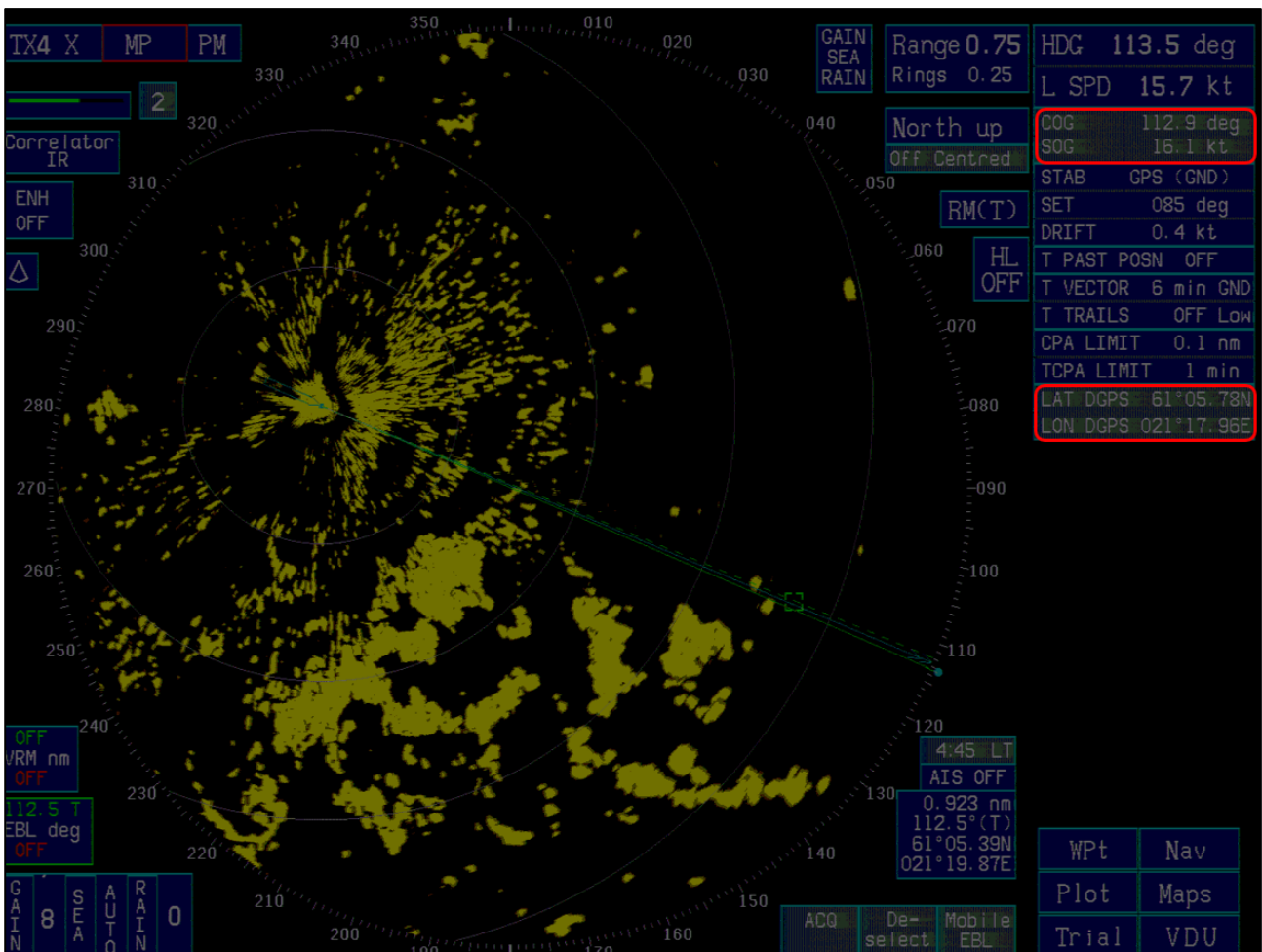
<sup>13</sup> Bulletin 149 of the Ministry of the Interior, 28 December 2018.

card, the recommended speed at this section of the channel is 12 knots (approximately 22 km/h). Turning the vessel to the left to true heading 069 degrees was started after passing the Osmo edge mark. The deckhand acted as the helmsman. According to the master, the vessel did not turn into the new direction fast enough; instead, it drifted over the shallows outside the fairway area at 05:48. At the time of turn the trail echoes made interpreting the radar image more difficult. The lines and way points in accordance with the voyage plan can be detected on the radar image.

Based on the VDR information, the vessel started its turn roughly two vessel lengths after the Osmo edge mark. At that point, the vessel was already at the right outer edge of the fairway area. The vessel started to turn to the direction 069°, but it drifted out of the fairway area and ran over ground.



**Picture 14.** Quality of the radar image on the starboard manoeuvring station before the turn towards the direction 069° at 05:45:57. A strong radar echo trail caused by the Trail function can be seen in the image. The Osmo edge mark was in a blind spot on the left side of the vessel, which is continuing in the direction of 113 degrees at the speed of 16.2 knots (approximately 30 km/h). (Source: VDR recording, notes: SIA).



**Picture 15.** Quality of the radar image on the port side manoeuvring station before the turn towards the direction 069° at approximately 05:46:00. The radar image shows strong radar echo gains. (Source: VDR recording, notes: SIA).

After the grounding, the engine room reported that there was water in several compartments. The speed of the vessel reduced to 8 knots (approximately 15 km/h). The master gave the “ABANDON SHIP” alarm. After the running over ground, the chief officer came to the bridge. The master notified West Coast VTS of the events at 05:49 (VHF channel 09).

Both lifeboats of M/V Timca were prepared to use in case of evacuation. The master stated that the vessel was not in an immediate danger of sinking and was manoeuvrable. The vessel was steered back to the channel, and it continued to the Port of Rauma, which was at a distance of approximately four nautical miles (approximately 7.5 km). With the help of a tugboat, the vessel berthed at the Port of Rauma at 07:10.

## 2.4.2 Safety management

The safety management system of the vessel describes i.e., how a voyage plan is to be made, how the ECDIS device is used and updated and how to navigate in ice conditions; it also describes pilotage, the use of radar and watchkeeping.

The watchkeeping instructions require good navigation practices that include cross-checking the vessel's location data based on different sources and visual navigation to support electronic navigation. According to the instructions, automatic steering should not be relied

too far. In addition, it specifies five minutes as the location interval when navigating coastal waters and recommends use radar bearings and distances for use in navigation.

The vessel's instructions on pilotage assign the monitoring of the vessel's position and confirming it on the chart as the responsibility of the master and the rest of the bridge crew. The instructions concerning pilotage also require the monitoring of the vessel's speed, weather conditions, steering responses, and other traffic. The watchkeeping instructions mention appropriate lookout that enables the continuous assessment of the risk of grounding. These instructions also mention methods on how the master clearly states verbally that he is either taking over or relieving the responsibility of navigation.

The instructions concerning navigating in ice conditions separately mention radar settings when following a passage through ice (channel) and observe it on the radar. Otherwise, no instructions are given on radar settings while navigating in ice. In the instructions on the voyage plan, the route is planned from berth to berth, that is, including the piloted sections. When planning piloted sections and the route in narrow passages, instructions are given to pay special attention to the Under Keel Clearance, tides and currents as well as local weather conditions and forecasts. According to the instructions, good practice for navigating narrow passages requires a helmsman on the bridge, a separate lookout when navigating in congested waters, and if necessary, an additional officer focusing on navigation to strengthen the bridge team, anchors ready to be dropped and two auxiliary engines available.

The instructions on the voyage plan include a checklist of preparations for departure. The starting points of the turns (Wheel Over Point) or the radius or the rate of turns had not been specified in the voyage plan, and it did not include information required for safe decision-making in pilotage.

## **2.5 Preventive measures by the authorities**

### **2.5.1 Pilotage**

According to the Finnish Pilotage Act (940/2003) and the Government Decree on Pilotage (1385/2016), all vessels arriving at and departing from Finnish ports must use a pilot, if it is required by the size of the vessel or dangerous or harmful cargo transported by the vessel. Pilotage is an activity related to navigating vessels, in which the pilot acts as an advisor of the vessel's master as well as an expert on the water area and navigation. The aim of pilotage is to promote the safety of vessel traffic and prevent damage to the environment caused by vessel traffic.

Pilots have the right to perform pilotage in channels in which they, by virtue of the Pilot Licence granted by the Finnish Transport and Communications Agency Traficom, are entitled to serve as pilots.

In accordance with the Pilotage Act, the Finnish Transport and Communications Agency Traficom issues more detailed regulations on pilot examinations, practical pilotage assessments, pilotage areas and pilot boarding areas. Vessels with a master that has completed a Pilotage Exemption Certificate examination or to which the Finnish Transport and Communications Agency Traficom has granted a pilotage exemption are exempt from compulsory pilotage.

In a separate regulation (TRAFI/57228/03.04.01.00/2015), the Finnish Transport Safety Agency Trafi has issued the more detailed regulations referred to in section 11a(4) of the

Pilotage Act on the content of the modules of a pilot examination, passing or failing the examination as well as a certificate issued for the examination, in addition to the methods used in the practical pilotage assessment referred to in section 11a(1) of the Pilotage Act as well as its arrangements, conditions and the practical pilotage assessment documents. The party granting the licences, that is, the Finnish Transport and Communications Agency Traficom, is responsible for practical pilotage assessments. The practical pilotage assessment is completed on a vessel, and an official of the Finnish Transport and Communications Agency Traficom acts as the examiner. The master must be present during the practical pilotage assessment, and if the master does not hold a Pilotage Exemption Certificate, an experienced pilot holding a Pilot Licence for the channel must be present.

In addition, the Finnish Transport and Communications Agency Traficom has issued work instructions for examiners of a practical pilotage assessment (TRAFICOM/377312/00.00.02/2020). The aim of the instructions is to harmonise and clarify the way the regional inspection teams arrange the written test and blank chart test for Pilotage Exemption Certificate applicants and conduct the practical pilotage assessment on a vessel.

### **2.5.2 Practical pilotage assessment**

The examiner ensures that all requirements of a practical pilotage assessment are met (written test, blank chart test, a test in a simulator and a sufficient number of training voyages).

During the assessment voyage, the examiner monitors the situation in accordance with a checklist. The issues being checked include:

1. Implementing and monitoring the voyage plan, manoeuvring on the fairway area, checking the turning points with the help of different methods, monitoring the passing distances, verifying the location of the vessel with different methods.
2. Control of the vessel's equipment and movement, knowledge of the bridge equipment, controlled use of the propulsion and rudder systems, control of the direction and changes of direction, control of the speed and changes of speed, taking the functional limitations of the vessel into account, taking the external conditions into account.
3. Applying navigation knowledge into practice, planned use of the channel area, following the rules of the road at sea, taking other traffic into account, following the speed limits, following the rules, regulations and guidelines related to the channel, and mastery of the procedures related to tugboat assistance (if necessary).
4. Skills related to bridge teamwork and communication, prioritisation of tasks while taking safety considerations into account, timeliness of decision-making, good teamwork on the bridge, sufficient language skills, internal communication, communication with the VTS, communication with other traffic as well as submitting notifications related to safety or environmental protection (if necessary).

The knowledge concerning the channel and traffic will be checked based on questions. The candidate states the measures and operations in advance he intends to take so that errors, if any, can be addressed in time. At the end of the assessment voyage, the examiner gives the candidate oral feedback and informs the candidate on whether they have passed or failed the

assessment. If the candidate failed the practical pilotage assessment, written feedback with grounds will be sent to the candidate within a week.

The regulation of the Finnish Transport Safety Agency Trafi requires that a candidate pass practical pilotage assessment must demonstrate that they have the information in accordance with the regulation, insofar as they can be tested taking the traffic area, vessel type, traffic conditions and season into account. Before a practical pilotage assessment, the examiner, the master of the vessel and the practical pilotage assessment candidate as well as the pilot, if necessary, must review the practical pilotage assessment event and the voyage plan. The devices normally used with their usual adjustments as well as the normal channel navigation procedures must be used on the vessel during the assessment.

The master of the vessel and the examiner of the practical pilotage assessment are tasked to evaluate whether the conditions allow the practical pilotage assessment to be conducted safely. It is not possible to conduct assessment only in conditions, in which fixed ice considerably limits the manoeuvring of the vessel in the channel. The examiner of the practical pilotage assessment must take the assessment of the pilot and the master of the vessel concerning the skills of the candidate into account when making the decision on the candidate passing or failing the practical pilotage assessment.

Where applicable, the following serve as the criteria for a candidate passing the practical pilotage assessment:

- 1) is familiar with the requirements concerning a voyage plan and is able to follow the voyage plan during a test conducted in a ship simulator;
- 2) is familiar with the functional limitations of the vessel and is able to act accordingly;
- 3) is able to maintain control of the vessel's motion at all times;
- 4) has mastered the use of the fairway area and uses the machinery as well as the propulsion and rudder systems of the vessel in a controlled manner;
- 5) acts with deliberation and practices good seamanship;
- 6) is able to apply their navigation skills in practice;
- 7) is able to prioritise issues and make decisions while taking into account the safety considerations related to the situation;
- 8) is familiar with the bridge teamwork procedures and is able carry them out in practice; and
- 9) able to communicate effectively with the people on the bridge team, the Vessel Traffic Service, ports, the icebreaking service and other vessels.

A form published electronically by the Finnish Transport Safety Agency Trafi was used in the practical pilotage assessment (record of practical pilotage assessment). Separate provisions have been issued concerning the evaluation criteria of the written test as well as the blank chart and simulator tests.

In the practical pilotage assessment record, the following things must be confirmed before piloting:

- The practical pilotage assessment is included in the safety management system (yes/no)
- BRM (used/not used)
- Voyage planning (used/not used)
- Communication (Finnish, Swedish, English)

Concerning the issues above, it is only stated whether they have been taken into account or not without commenting on their content.

Issues assessed during a practical pilotage assessment:

- Navigation in the fairway area (pass/fail)
- Following the voyage plan (pass/fail)
- Taking the other traffic into account (pass/fail)
- Communicating with the VTS (pass/fail)
- Communicating with other traffic (pass/fail)

The assessment does not include a qualitative assessment of these matters.

The practical pilotage assessment required for a Pilotage Exemption Certificate was completed in accordance with the instructions of the Finnish Transport and Communications Agency Traficom.

The examiner of a practical pilotage assessment does not interfere with the manoeuvring of the vessel unless there is a dangerous situation or if the applicant fails the practical pilotage assessment due to a major error.

### **2.5.3 Quality control of pilot training**

**Auditing and transparency.** With regard to the pilot examination, the Turku school (Aboa Mare) was audited in 2011 and the Kotka school (Ekami) in 2015. After this, neither school has been audited again. There is a dialogue between the schools and the Finnish Transport and Communications Agency Traficom that is considered to work well, but there are no regular audits, which has for its part led to the differentiation of training. The responsible authority has not sufficiently ensured that training of uniform quality with the same content is implemented at the educational institutions. Continuous improvement and standardisation of content is difficult if the educational institutions do not have sufficiently clear instructions on the intentions of the authority in order to organise the whole.

### **2.5.4 Vessel Traffic Service**

The Vessel Traffic Service monitors and supervises the realisation of compulsory pilotage in the areas under its responsibility. In Finland, VTS activities (Vessel Traffic Service) are provided by Fintraffic VTS. The purpose of marine traffic control is to improve safety and promote good traffic flow and efficiency, among other things The Vessel Traffic Service is provided for by the Vessel Traffic Service Act (623/2005) as well as the Government decrees on a Vessel Traffic Service.



Fintraffic VTS has three VTS centres, monitoring areas cover all coastal merchant shipping channels as well as the deep-water channel in the Saimaa area. The VTS centres are located in Turku, Helsinki and Lappeenranta. In addition, the sea areas on the Finnish coast are divided into six VTS areas. They are the Bothnia VTS, West Coast VTS, Archipelago VTS, Hanko VTS, Helsinki VTS and Kotka VTS. In addition, Saimaa VTS operates in the Saimaa deep-water channel area.

All vessels longer than 24 m are obliged to participate in the VTS. All traffic in the VTS area is asked to monitor the working channel of the VTS area. In order to improve safety, the VTS is currently provided primarily in English. If necessary, Finnish and Swedish can also be used. When moving in the VTS area, the working channels of the area must be monitored and the traffic rules in the area must be followed. The special characteristics of the VTS areas are described in the Master's Guides.

A VTS provider must notify the maritime authorities, maritime rescue and environmental authorities, the authorities in charge of surveillance of territorial integrity, police or customs authorities as well as the port authorities in question about important issues related to the safety of a certain vessel or the people on it, sea rescue, environmental protection, surveillance of territorial integrity or customs control that it has detected or that have been reported to it. In Finnish waters, the master of the vessel must notify the VTS provider of all dangerous situations or accidents that affect the safety of the vessel.

The VTS also gives guidance to authorities, if necessary, and monitors compliance with the Pilotage Act. When a vessel uses a Pilotage Exemption Certificate, an exemption from compulsory pilotage or other exemption granted to it, the master of the vessel must report the number of the exemption certificate to the VTS centre when the vessel arrives in a VTS area.

## **2.6 The organisations that participated in the rescue activities and their readiness**

### **2.6.1 Finnish Border Guard**

The Finnish Border Guard is the leading maritime rescue authority responsible for the organisation of maritime rescue services in Finland. The tasks are led from the Maritime Rescue Coordination Centre in Turku (MRCC)<sup>14</sup> and the Maritime Rescue Sub-Centre in Helsinki (MRSC)<sup>15</sup>. In addition, other authorities operating in the sea and coastal area and volunteers led by the Maritime Rescue Coordination Centre also participate in maritime rescue. The maritime rescue coordination centres are responsible for receiving the notification and alerting the units, and they lead the maritime rescue task.

### **2.6.2 Satakunta Rescue Department**

The Satakunta Rescue Department is responsible for rescue tasks in its operating area as well as oil spill prevention and response with regard to the coast and the archipelago. According to the Act on Oil Pollution Response, in the event of an oil spill, the prevention and response operations shall be managed by the rescue authority of the rescue service region where the oil spill or risk incident first occurred. Regional rescue services must have a plan in place for the prevention of and response to oil spills that includes plans for land-based oil spills and, if

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<sup>14</sup> Maritime Rescue Coordination Centre.

<sup>15</sup> Maritime Rescue Sub-Centre.

necessary, oil spills from ships. The Satakunta Rescue Department has drawn up and signed an oil spill prevention and response plan for 2020–2024. The plan has been sent to the Finnish Environment Institute (SYKE) and the ELY Centre for a comment. The circulation for comment is in progress. The plan has been drawn up in accordance with section 2 of the Government Decree on combating oil spills (249/2014), and it was in operative use when the accident involving M/S Timca occurred.

Among other things, the Satakunta Rescue Department has two large class F workboats intended for oil spill prevention and response in sea areas, one of which is located in Rauma. There is approximately three kilometres of an over 750 mm oil boom available for preventing the oil spill from spreading.

The Satakunta Rescue Department does not have suitable vessels for oil booming in ice conditions, in which case an external operator must be used for deploying the boom.

### **2.6.3 Alfons Håkans Oy Ab**

Alfons Håkans Oy Ab is a Finnish company established in 1945 that offers services such as harbour towage, harbour icebreaking, towing oil rigs, different kinds of maritime transport, rescue operations and dockyard activities.

Alfons Håkans Oy Ab's tugboat Neptun was called by telephone at 6:23 in the morning of the day of the accident to assist M/V Timca with berthing. Another tugboat of Alfons Håkans Oy Ab, Jupiter, deployed an oil boom around M/V Timca.

### **2.6.4 Port of Rauma**

The Port of Rauma has a total of 20 berths for import, export and transit traffic. The Port of Rauma is a major paper, timber and container traffic hub. An environmental permit was granted to the Port of Rauma in 2007.

The ISPS safety plan of the Port of Rauma has been audited and approved by the Finnish Maritime Administration, meaning that the port complies with the requirements of the International Ship & Port Facility Security Code.

According to the Rescue Act, the manager of a port intended mainly for merchant shipping is obliged to draw up a plan for combating of and preparedness for oil spills and chemical spills from vessels in the area. The port manager and the operator must purchase the equipment necessary for preventing and limiting oil spills and chemical spills from vessels. The operator must also ensure that trained personnel are available to operate the equipment for combating spills. The plan must be sent to the Centre for Economic Development, Transport and the Environment for their information. The Port of Rauma has an oil spill prevention and response plan as well as oil spill prevention and response equipment placed in the port area. An oil spill prevention and response organisation consisting of the port personnel has been formed. The necessary number of personnel is used for oil spill prevention and response depending on the situation, and off duty personnel can be called on site, if needed. Depending on the extent and severity of the oil spill, the regional Rescue Department can also be called in to assist. Every oil spill must nevertheless be reported to the Rescue Department.

## **2.7 Regulations, order and instructions**

### **2.7.1 Maritime Act.**

Section 11a of the Maritime Act<sup>16</sup> provides for the notification obligation in case the vessel is in distress or at risk of being in distress. The master of M/V Timca acted accordingly when the accident occurred.

### **2.7.2 Pilotage Act, Decree and Regulation**

The aim of the Pilotage Act<sup>17</sup> is to promote the safety of vessel traffic and thereby also prevent damage to the environment caused by vessel traffic. The act provides for the obligation to use a pilot and the duties and responsibility of pilots.

A vessel can be granted an exemption from compulsory pilotage<sup>18</sup>, even if pilotage is compulsory for it due to its size, if the Finnish Transport and Communications Agency Traficom has granted a Pilotage Exemption Certificate referred to in section 14 or an exemption referred to in section 16 for the specific ship and channel or water area to its master.

Section 8 of the Pilotage Act stipulates that the pilot is responsible for the pilotage operation. The pilot must present the master of the piloted vessel with a voyage plan based on up-to-date charts and any other information and instructions necessary for the safe passage of the ship and supervise any measures related to the manoeuvring and handling of the ship that are of significance for the safety of vessel traffic and environmental protection. The pilot is obliged to report to the VTS any observations of significance for the safety of navigation, for the safety of the ship, persons on board and the environment, and for maritime and customs surveillance. The pilot must also report any damage caused to or by the ship and, upon request, provide the authorities with further information thereon. These duties and responsibilities in accordance with section 8 have only been assigned to the pilot in the Pilotage Act. They have not been assigned to a holder of a Pilotage Exemption Certificate in the Act. Section 2 of the Pilotage Act does not include a definition of a Pilotage Exemption Certificate holder.

The Pilotage Act specifies the requirements for receiving a Pilotage Exemption Certificate. According to the requirements, the applicant must complete at least ten voyages in one direction through the channel in question as well as a pilot examination and a practical pilotage assessment for the channel in question, and the applicant must also have sufficient language skills and knowledge of place names.

The voyages must be completed in the vessel in question, or in a vessel, the size and technical characteristics of which essentially correspond to the vessel subject to the application, and the applicant must participate in navigation in the channel recorded in the Pilotage Exemption Certificate or the channel and a vessel simulator as the master or officer. The pilot examination includes a blank chart test for the channel in question, a written test for the channel in question as well as a simulator test. The simulator test can be completed for a different channel, if the applicant has completed such a test for any other piloted channel in Finland within the last five years.

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<sup>16</sup> 674/1994

<sup>17</sup> 940/2003

<sup>18</sup> 986/2018, section 5

The Finnish Transport and Communications Agency Traficom granted a Pilotage Exemption Certificate for the Rauma 12 M channel on 11 September 2020 to the person who acted as the vessel's master in the accident involving Timca. The master had completed 24 round trips in the channel in question during the period 7 February 2018–18 August 2020 as well as a practical pilotage assessment in the channel in question on 11 September 2020. The master had completed a blank chart test for the channel in question and a written test for the channel in question included in the pilot examination on 3 September 2020. Instead of the Rauma channel, the master had completed the simulator test included in the pilot examination for the Hanko channel on 23 March 2016.

The Government Decree on Pilotage (1385/2016) issues the more detailed provisions referred to in the Pilotage Act concerning the Pilot Licence, Pilotage Exemption Certificate, exemption from compulsory pilotage and the special requirements on the party organising pilot examinations.

The regulation on pilot examinations and practical pilotage assessment TRAFI/57228/03.04.01.00/2015, issued on 30 December 2016, includes more detailed regulations on the content of the modules of a pilot examination, passing or failing the examination as well as a certificate issued for the examination, in addition to the procedures, arrangements and conditions of the practical pilotage assessment as well as practical pilotage assessment documentation, in addition to procedures related to applying for and renewing a Pilot Licence, Pilotage Exemption Certificate and exemption from compulsory pilotage.

The pilotage regulation stipulates that the test carried out in a vessel simulator includes drawing up a voyage plan for the channel subject to the examination and implementing it in the vessel simulator. The voyage plan can be drawn up either in writing or electronically. The regulation on the voyage planning of vessels (TRAFI/12134/03.04.01.00/2011) must be followed in drawing up the voyage plan, when applicable.

According to the regulation, a Pilot Licence applicant must pass all tests included in the examination, and a Pilotage Exemption Certificate applicant must also pass the practical pilotage assessment. If a Pilot Licence applicant fails one of the tests included in the pilot examination, the applicant must retake the test in question. If the applicant fails more than one test included in the examination, the applicant must retake the whole examination. There are no provisions determining how soon or how many times the examination can be retaken. A failed practical pilotage assessment can be retaken after the applicant has completed at least two practice voyages in the channel subject to the practical pilotage assessment in the directions subject to the application.

### **2.7.3 Border Guard Act and Maritime Search and Rescue Act**

According to the Border Guard Act (578/2005), the duties of the Finnish Border Guard in the field of maritime rescue are provided for in the Maritime Search and Rescue Act. The Maritime Search and Rescue Act (1145/2001) stipulates that the Border Guard is the leading maritime search and rescue authority and responsible for the provision of maritime search and rescue (SAR) services.

According to section 3 of the Maritime Search and Rescue Act, the Border Guard is the leading maritime search and rescue authority responsible for planning, development and supervision of maritime SAR services and the harmonisation of the activities of the authorities and volunteers participating in maritime SAR services.

## 2.7.4 Rescue Act

The Rescue Act stipulates that the Border Guard is in charge of combating oil spills and chemical spills from vessels in Finnish waters and exclusive economic zone and harmonises the preparedness for them. The Satakunta Rescue Department is responsible for rescue tasks in its operating area as well as oil spill prevention and response with regard to the coast and the archipelago. According to the Act on Oil Pollution Response, in the event of an oil spill, the prevention and response operations shall be managed by the rescue authority of the rescue service region where the oil spill or risk incident first occurred. Rescue activities in port areas are the responsibility of the regional rescue department, but as an operator, the port is obliged to draw up safety and emergency plans, based on which it starts rescue operations after an accident has occurred. The Rescue Department accepts the authority for the situation as soon as its first rescue unit arrives at the scene.

## 2.8 Other investigations

The investigation studied separately the procedures related to arranging pilot training and receiving a Pilotage Exemption Certificate.

### 2.8.1 Pilot qualifications and training

**Pilot licences** include the channel-specific Pilot Licence, the vessel and channel-specific Pilotage Exemption Certificate as well as the vessel and channel-specific exemption from compulsory pilotage.

**A Pilotage Exemption Certificate** is a vessel and channel-specific licence that can be granted to the master or officer of the vessel. However, an exemption from compulsory pilotage requires the master of the vessel to hold a Pilotage Exemption Certificate.

**Pilotage Exemption Certificate examination.** In order to receive a Pilotage Exemption Certificate, the applicant must complete an examination consisting of three tests. The tests include a blank chart test, a written test and a test in a vessel simulator

In a separate regulation (TRAFI/57228/03.04.01.00/2015), the Finnish Transport and Communications Agency Traficom<sup>19</sup> has issued the more detailed regulations referred to in section 11a (4) of the Pilotage Act (940/2003) concerning the content of the different aspects of the pilot examination, passing and failing the test, as well as a certificate issued for the examination as referred to in section 11a (1) of the Pilotage Act.

**The blank chart test** requires the applicant to demonstrate knowledge of the vessel's characteristics as well as control of the vessel's motion and the handling of the vessel both in a written test as well as a vessel simulator test.

The applicant fails the blank chart test, if the applicant cannot demonstrate knowledge of at least 70 per cent of the required information or if the applicant does not have the information necessary to pass through the critical points of the channel.

“In the blank chart test, the applicant must demonstrate the mastery of the following local knowledge:

1) the fairway area, water depth and gross under keel clearance calculations for the channel's design vessel, courses,

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<sup>19</sup> The Finnish Transport and Communications Agency Traficom is responsible for the official duties related to pilotage that were previously carried out by the Finnish Transport Safety Agency Trafi.

aids to navigation, anchorages, the type of the bottom, islands and shallows in the vicinity of the channel as well as the air draught of obstacles limiting the passage of vessels;

2) the place names used in navigation and communication with the Vessel Traffic Service and the icebreaking service in Finnish or in Swedish; and

3) the VTS areas and reporting points related to the channel subject to the examination.

The blank chart test can be completed in several sections.”

**The written test** requires the applicant to demonstrate knowledge of the following issues related to regulations and instructions:

- Vessel Traffic Service Act (623/2005) and the statutes and regulations issued under it as applicable,
- Pilotage Act and the statutes and regulations issued under it, as well as the following as applicable:
- the Act on Oil Pollution Response (1673/2009) and the Act on Environmental Protection in Maritime Transport (1672/2009) as well as the regulations issued under them;

2) instructions on the Vessel Traffic Service and the related notification obligations and other obligations;

3) instructions on icebreaking services and cooperation practices;

4) alarm and notification obligations concerning accidents at port and in the sea area;

5) the ports and port areas related to the channel subject to the examination and the instructions followed there; and

6) regulations on traffic in the Saimaa Canal, if the application concerns the Saimaa Canal.

If the applicant cannot master at least 70 per cent of the required information, the applicant fails the written test.

**The requirement for approval of the vessel simulator test** is that the applicant:

1) is familiar with the requirements concerning a voyage plan and is able to follow the voyage plan during a test conducted in a ship simulator;

2) is familiar with the functional limitations of the vessel and is able to act accordingly;

3) is able to maintain control of the vessel’s motion at all times;

4) has mastered the use of the fairway area and uses the machinery as well as the propulsion and rudder systems of the vessel in a controlled manner;

5) acts with deliberation and practices good seamanship;

6) is able to apply their knowledge of navigation in practice;

7) is able to prioritise issues and make decisions while taking the safety considerations related to the situation into account;

8) is familiar with the procedures c in the cooperation on the bridge and can carry them out in practice; and

9) able to communicate effectively with the people on the bridge, the Vessel Traffic Service, ports, the icebreaking service and other vessels.

A simulator test is not mandatory, however, if the Pilotage Exemption Certificate applicant has completed a simulator test for another channel. The master of M/V Timca had completed the simulator test for the Hanko channel.

The party arranging the test is responsible for the assessment of the simulator test. When auditing the training provider, the Finnish Transport Safety Agency Trafi has confirmed the provider's suitability for holding examinations.

### **2.8.2 Pilot examinations.**

The schools offering pilot examinations are Aboa Mare in Turku, the Etelä-Kymenlaakso Vocational College in Kotka, Högskolan på Åland in Mariehamn and the Satakunta Vocational College in Rauma.

The pilot examinations are held in accordance with the Pilotage Act, Decree and Regulation. The same regulations provide for all obligations and qualifications related to pilotage that apply to Finn-pilot pilots, Pilotage Exemption Certificate holders as well as other exemptions from compulsory pilotage. At the schools, the regulations in question are felt to be complicated and partially too broad. For example, more clarity is desired in the acceptance criteria of the different parts of the different examinations, the rejection and retake process, documentation and archiving.

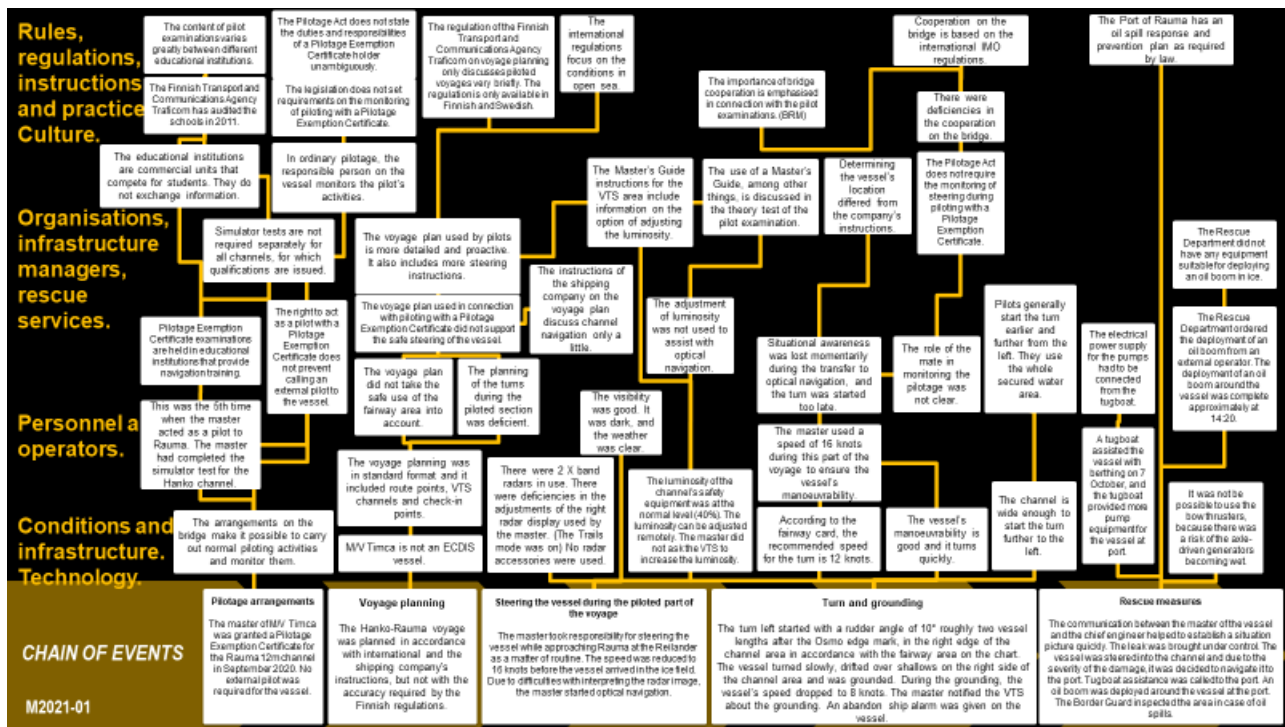
In addition, there has been discussion about the fact that the simulator test does not need to be taken separately for each channel. For instance, the skills required to navigate the Hanko and the Rauma channel differ significantly from each other. Moreover, navigation in ice conditions is included very little or not at all in the pilot examination.

The organisation of pilot training is a commercial activity. The schools do not discuss the training arrangements with each other, because they feel that interaction would be a competitive threat. There is no party that would monitor the quality of pilot training or conformity between different service providers. The practices observed at the schools, their level of documentation and the qualifications required from the trainers and examiners vary.

### 3 ANALYSIS

#### 3.1 Event analysis

The Accimap method further developed by the Safety Investigation Authority has been used in the event analysis. The structure of the analysis text is based on the Accimap diagram drawn up during the investigation. The accident is described as a chain of events at the bottom of the diagram. Factors revealed in the background of the chain of events are discussed in the diagram at different levels of analysis.



Picture 16. Accimap diagram (Image: SIA)

#### 3.2 Pilotage arrangements

The master of M/V Timca has a valid vessel- and channel-specific Pilotage Exemption Certificate for the Rauma 12 M channel. The master had been granted the certificate five months before the accident.

The voyage during which the accident occurred was the master's fifth time of acting as a pilot with a Pilotage Exemption Certificate in the Rauma channel. The master had completed the examination at Ekami in Kotka and Aboa Mare in Turku. The Pilotage Exemption Certificate examination does not include navigation in ice conditions. The simulator test was taken only for the Hanko channel. The examiner of the practical pilot assessment for the Rauma channel was an official of the Finnish Transport and Communications Agency Traficom with pilotage expertise.

The Pilotage Act does not specify the duties and obligations of a Pilotage Exemption Certificate holder unambiguously. Neither does the legislation set any specific requirements on monitoring pilotage. The master's right to act as a pilot with a Pilotage Exemption Certificate did not prevent ordering a pilot, if necessary.



### **3.3 Voyage planning**

The voyage plan of M/V Timca had been drawn up from Hanko to the port of arrival in Rauma. The voyage plan had been drawn up in the same way as for the offshore navigation, and it did not take the special characteristics of the piloted channel into account separately. In practice, the voyage plan was based on waypoints. It had not been supplemented in any other way (the turning radius or starting points of turns had not been marked on the plans). The voyage plan did not take the national instructions (Finland) concerning the plan into account. The voyage plan had not taken into account of the option of adjusting the luminosity of the safety equipment on the Rauma 12 M channel, which could have been requested from the VTS. The voyage plan complied with the shipping company's regulations concerning such plans, which did not emphasise the importance and significance of following the instructions given by the coastal state concerning the voyage plan.

The Finnish Transport and Communications Agency Traficom has issued a regulation on voyage planning concerning Finnish vessels. The regulation is only available in Finnish and in Swedish.

### **3.4 Manoeuvring the vessel during the piloted part of the voyage**

In addition to the master, the second officer and the helmsman were present on the bridge. The master navigated independently, and the second officer did not notice anything to comment on the actions or intervene in it in any way. There was fairly no communication between the master of M/V Timca, the second officer and the helmsman during both channel navigation and the turns. The master, who was acting as a pilot steered and navigated the vessel practically alone, meaning that the support of the bridge crew was not utilised.

When arriving in the Rauma 12 M channel, the second officer switched on the X band radar linked to the display of the left manoeuvring station. The equipment of M/V Timca seemed to function as normal before the accident, and the arrangements on the bridge made it possible to monitor the actions taken by the master acting as a pilot as well as the progress on the route. The quality of the radar image did not arise any discussion. The settings of the radar display used by the master reduced the readability of the radar image, meaning that situational awareness of the exact location of the vessel was lost momentarily and the master started to navigate the vessel optically.

### **3.5 Turn and grounding**

At the start of the turn, the vessel's speed was 16 knots and the turn started with a rudder angle of 10 degrees, roughly two vessel lengths after the Osmo edge mark. The vessel did not take advantage of the whole width of the fairway area during the turn. The vessel did not have time to turn to a new course; instead, it drifted and run over ground on the right side of the fairway area. After the grounding, the master estimated that the vessel had maintained sufficient seaworthiness and steerability. The master decided to navigate the vessel to the port, where it would be easier to get assistance.

### **3.6 Rescue operations**

Due to the good communication between the master and the chief engineer, it was possible to establish an overall picture of the situation quickly. The flooding could be limited and controlled with pumps, meaning that the vessel was not at immediate risk of sinking.

At the port, more drainage pumps were provided for the vessel by the tugboat that assisted it with berthing. With the additional pumps, it was possible to stabilise the situation and lower the surface of the water flooding into the vessel.

The Satakunta Rescue Department needed additional assistance to deploy an oil boom in ice conditions. A tugboat suited for booming came from Pori, and therefore the oil boom could only be deployed around the vessel in the afternoon.

### **3.7 Piloting with Pilot Exemption Certificate (PEC)**

A Pilotage Exemption Certificate allows a vessel that would otherwise be subject to compulsory pilotage to navigate channels with compulsory pilotage without a separate pilot. However, the Pilotage Act does not unambiguously prescribe the duties and obligations of a Pilotage Exemption Certificate holder, and a Pilotage Exemption Certificate holder is not separately specified to correspond to a pilot in the Act. A Pilot Licence requires 25 voyages both ways through the channel, while the same requirement to receive a Pilotage Exemption Certificate for a cargo vessel is 10 voyages. With the exception of the first licence, the number of voyages required of a Pilot Licence is not higher.

Training in a vessel simulator every five years is required to renew a Pilotage Exemption Certificate.<sup>20</sup> The training must consist of a compilation of the renewed channels and it must include practice with exceptional situations.

A verified written report on the training must be presented. It cannot be failed. A simulator test is not mandatory, however, if the Pilotage Exemption Certificate applicant has completed a simulator test for another channel.

The legislation does not set any separate requirements on the monitoring or supervision of piloting with a Pilotage Exemption Certificate; instead, when a master acts as a pilot with a Pilotage Exemption Certificate, they primarily have the responsibilities of a master, and the responsibilities related to piloting have not been assigned separately to anyone else.

### **3.8 Practical pilotage assessment**

As the party granting licences, the Finnish Transport and Communications Agency Traficom is responsible for the practical pilotage assessment. The practical pilotage assessment required for the Pilotage Exemption Certificate held by the master of M/V Timca was completed in accordance with the instructions of the Finnish Transport and Communications Agency Traficom.

The examiner of the practical pilotage assessment does not intervene in the steering of the vessel with the exception of dangerous situations or due to a major error. The assessment of the practical pilotage assessment is only done on a general level, and it does not usually address factors related to channel navigation or pilotage, such as the voyage plan, control of the vessel's equipment or motion, working on the bridge or communication.

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<sup>20</sup> Government Decree 1385/2016

### **3.9 Pilot examinations and quality control**

The educational institutions offering pilot training have been audited before granting them a training permit. The Finnish Transport and Communications Agency Traficom (or its predecessor Finnish Transport Safety Agency Trafi) has not interfered with the training arrangements after that. The training methods and materials are produced for the educational institution's own use, and the curricula and examination material are known only to the educational institution itself as well as the supervisory authority (Finnish Transport and Communications Agency Traficom). The related commercial interests and lack of dialogue between schools due to the competitive situation make it more difficult to harmonise the training.

Quality control of the training is not systematic. Continuous improvement and harmonisation of the content is difficult if the educational institutions are not issued sufficiently clear instructions on the intentions of the authority in order to organise the training.

There is no party that would monitor the quality of pilot training or consistency between different service providers. The practices observed at the schools, their level of documentation and the qualifications required from the trainers and examiners vary a great deal. The responsible authority has not sufficiently ensured that training of uniform quality with the same content is realised, which would promote a uniform level of safety.

## 4 CONCLUSIONS

The conclusions include the causes of the accident or incident. A cause means the various factors behind the incident and the direct and indirect circumstances affecting it.

1. The master had been granted a Pilotage Exemption Certificate for the Rauma 12.0 M channel five months before the accident. He had completed the simulator test for the Hanko channel. The master had only demonstrated piloting a vessel on the Rauma 12 M channel with one practical pilotage assessment. When the accident occurred, the master was acting as a pilot with a Pilotage Exemption Certificate in the Rauma channel for the fifth time.

***Conclusion.** A person can be granted a Pilotage Exemption Certificate, even though they only have little experience with piloting in narrow passages and in winter conditions, and it is not always necessary to demonstrate the skill in a simulator test drawn up for the channel in question.*

2. The current regulations do not sufficiently emphasise taking the factors due to the special characteristics of the coastal state into account in the voyage planning of piloted channels. The voyage plan of M/V Timca had been drawn up in the same way as for the offshore navigation, and it did not take the special characteristics of the piloted channel into account. In practice, the voyage plan was based on waypoints, and it did not take account of matters such as how turns would be made. The option of adjusting the luminosity of the safety equipment on the Rauma 12 M channel had not been considered in the voyage planning, either. The voyage plan was based on the shipping company's instructions.

***Conclusion:** The shipping company's instructions and requirements on voyage planning do not correspond to the instructions on safe navigation in narrow passages issued to Finnish vessels.*

3. The navigation equipment of M/V Timca seemed to function as normal before the accident, and the arrangements on the bridge made it possible to monitor the actions taken by the master as well as the progress on the route. There was hardly any communication between the master, the officer of watch and the helmsman during channel navigation and the turns. The Finnish legislation does not set separate requirements on the monitoring or supervision of piloting with a Pilotage Exemption Certificate. If the master acts as a pilot with a Pilotage Exemption Certificate, he still has the responsibilities of a master. In that case, the monitoring of the master's actions relies on the regulations issued by the shipping company.

***Conclusion:** A master acting as a pilot with a Pilotage Exemption Certificate may steer and navigate the vessel practically alone, meaning that the support of the bridge crew is not utilised. The shipping company's regulations do not necessarily acknowledge the practices related to piloting with a Pilotage Exemption Certificate, and they do not take the monitoring required for piloting with a Pilotage Exemption Certificate into account.*

4. At the start of the turn, the vessel's speed was 16 knots. The turn started with a rudder angle of 10 degrees, roughly two vessel lengths after the Osmo edge mark in the right side of the fairway area.

**Conclusion:** *The entire fairway area must be used in implementing and timing the turns.*

5. The navigation equipment of M/V Timca functioned as normal before the accident. The settings of the radar display used by the master reduced the readability of the radar image. The master lost awareness of the exact location of the vessel in the channel momentarily and started to steer the vessel optically.

**Conclusion:** *The radar settings had not been checked or adjusted to ensure their suitability for channel navigation before arriving at the section of the channel with compulsory pilotage. A voyage plan suitable for optical navigation had not been drawn up separately for the section of the channel.*

6. When the vessel's condition after the grounding was determined, the master decided to continue the voyage to the port, because it would be easier to get assistance at the port than at sea. The Rescue Department did not have a vessel suitable for ice conditions. The tugboat in the port was committed to the vessel rescue task, and there were no other vessels suited to deploying an oil boom available. Another tugboat was called from Pori.

**Conclusion:** *Deploying an oil boom around the vessel took a considerably long time in ice conditions, because there was not enough equipment immediately available for the purpose.*

7. There are differences between the criteria for granting a Pilot Licence and a Pilot Exemption Certificate. The requirements for pilots are based on the Pilot Licence, and the requirements for a holder of a Pilotage Exemption Certificate are task-based. In addition, there are differences between the criteria for granting a Pilot Licence and a Pilot Exemption Certificate with regard to the number of training voyages.

**Conclusion:** *A Pilotage Exemption Certificate can be granted with less experience than a Pilot Licence. The criteria for granting a licence or certificate do not include requirements based on the prevailing conditions and/or the applicant's experience, either.*

8. The practical pilotage operation is assessed by an official of the Finnish Transport and Communications Agency Traficom. The master must be present during the practical pilotage assessment, and if the master does not hold a Pilotage Exemption Certificate, an experienced pilot holding a Pilot Licence for the channel must be present. The practical pilotage assessment does not usually address factors related to channel navigation or pilotage, such as the voyage plan, control of the vessel's equipment or motion, working on the bridge or communication.

**Conclusion:** *The expert with the best local knowledge (a pilot with a Pilot Licence for the channel) may not always be present during the practical pilotage assessment for a Pilotage Exemption Certificate, which means that taking the local special characteristics related to navigation may remain incomplete.*

9. The Finnish Transport and Communications Agency Traficom has issued work instructions that define the areas assessed during the practical pilotage assessment as well as the issues discussed in the feedback situation after the practical pilotage assessment. There are four issues that need to be verified before piloting; their existence is merely noted without commenting on their content. There are 25 subject areas that are assessed during the practical pilotage assessment. The assessment is given orally without commenting on the qualitative realisation of the subject areas in any more detail. If the candidate failed the practical pilotage assessment, written feedback with grounds will be provided.

**Conclusion:** *The aim of instructions on the practical pilotage assessment is to harmonise the examiners' operating models. The issues being assessed that are included in the instructions do not support the giving of qualitative feedback for those who have passed the exam, and their documentation is not systematic, which would serve the development of pilot training.*

10. The training methods and materials are produced for the educational institutions' own use, and the curricula and examination material are known only to the educational institution itself as well as the supervisory authority (Finnish Transport and Communications Agency Traficom).

**Conclusion:** *The commercial interests related to the training and the lack of dialogue between schools due to the competitive situation make it more difficult to harmonise the training, which hinders the maintenance and development of the consistent safety level that is the objective of the training.*

11. There is no systematic quality control after the audit held in connection with starting the training. Continuous improvement and harmonisation of the content is difficult if the educational institutions are not issued sufficiently clear instructions by the authorities. The quality of pilot training or consistency between different service providers is not monitored. The practices observed at the schools, their level of documentation and the qualifications required from the trainers and examiners vary.

**Conclusion:** *The supervisory authority does not monitor the realisation of the content and quality of pilot training in order to ensure consistency, which hinders the maintenance and development of the consistent safety level that is the objective of the training.*

## 5 SAFETY RECOMMENDATIONS

### 5.1 Granting a Pilot Licence and a Pilotage Exemption Certificate

There are differences between the criteria for granting a Pilot Licence and a Pilotage Exemption Certificate. A person can be granted a Pilotage Exemption Certificate, even though they only have little experience with piloting in narrow passages and in winter conditions, and it is not always necessary to demonstrate the skill in a simulator test drawn up for the channel in question. A Pilotage Exemption Certificate can be granted with less experience than a Pilot Licence. The criteria for granting a licence or certificate do not include requirements based on the prevailing conditions and/or the applicant's experience, either.

The Safety Investigation Authority recommends that

*The Ministry of Transport and Communications develop the legislation related to granting Pilotage Exemption Certificates so that, if necessary, criteria can be placed for them taking into account factors related to the prevailing ice and snow conditions as well as the experience of the applicant. [2022-S1]*

Pilotage and piloting with a Pilotage Exemption Certificate must be able to guarantee a sufficient level of safety in all conditions.

### 5.2 Pilotage Exemption Certificate

The master had been granted a Pilotage Exemption Certificate for the Rauma 12 M channel five months before the accident. The master had only demonstrated piloting a vessel on the channel with one practical pilotage assessment. When the accident occurred, the master was acting as a pilot for the fifth time. A master acting as a pilot with a Pilotage Exemption Certificate may steer and navigate the vessel practically alone, meaning that the support of the bridge crew is not utilised. The shipping company's regulations do not necessarily acknowledge the practices related to piloting with a Pilotage Exemption Certificate, and they do not take the monitoring required for piloting with a Pilotage Exemption Certificate into account.

The Safety Investigation Authority recommends that

*The Finnish Transport and Communications Agency develop the requirements related to the Pilotage Exemption Certificate training and examination so that after completing the examination, a Pilotage Exemption Certificate holder can plan the route to be piloted and the monitoring of piloting with a Pilotage Exemption Certificate, as well as pilot the vessel safely in all conditions. [2022-S2]*

The requirements must emphasise the importance of the special characteristics of the section of channel in question, the control of the vessel's motion as well as the requirements set by the conditions.

### **5.3 The shipping company's regulations concerning piloting with a Pilotage Exemption Certificate**

The voyage plan of M/V Timca had been drawn up in the same way as for the offshore navigation and it did not take the special characteristics of the piloted channel into account. The voyage plan was based on the shipping company's instructions. The shipping company's instructions and requirements on voyage planning do not correspond to the instructions on safe navigation in narrow passages issued to Finnish vessels.

The Safety Investigation Authority recommends that

*The shipping company of M/V Timca, Spliethoff, specify its regulations related to pilotage so that they take account of the regulations, instructions and operating methods issued by the coastal state regarding pilotage and voyage planning for the channel to be piloted so that the safe navigation of the vessel through narrow passages can be ensured in all conditions. [2022-S3]*

The voyage plan for the channel to be piloted must provide a basis for the safe passage of the vessel and the control of its motion in all conditions.

### **5.4 The practical pilotage assessment required for a Pilotage Exemption Certificate**

An official of the Finnish Transport Safety Agency Trafi with pilotage expertise as well as the master of the vessel must be present during the practical pilotage assessment. If the master of the vessel does not hold a Pilotage Exemption Certificate, an experienced pilot holding a Pilot Licence for the channel must also be present. The expert with the best local knowledge (a pilot with a Pilot Licence for the section of the channel) is not always present during the practical pilotage assessment, which means that taking the local special characteristics related to navigation may remain incomplete. The assessment of the practical pilotage operation does not support providing instructive feedback to the applicant, and the feedback is not always documented systematically, which would serve the development of pilot training.

The Safety Investigation Authority recommends that

*The Finnish Transport and Communications Agency Traficom specify the instructions issued together with Finn pilot Pilotage Oy for the examiners of a practical pilotage assessment so that while preparing for piloting, during piloting and at the feedback event the topics related to the practical pilotage assessment are reviewed in sufficient detail and a written assessment is drawn up on their realisation. [2022-S4]*

A pilot with a Pilot Licence for the section of the channel must always be present during the Pilotage Exemption Certificate examination. This must be considered when specifying the instructions.



## 5.5 The monitoring of pilot training

The commercial interests related to the training and the lack of dialogue between schools due to the competitive situation make it more difficult to harmonise the training. The responsible authority does not monitor the realisation of pilot training systematically enough, which makes it more difficult to organise standardised pilot training.

The Safety Investigation Authority recommends that

*The Finnish Transport and Communications Agency Traficom draw up clear instructions for harmonising the training and monitoring its implementation systematically. [2022-S5]*

The monitoring must provide a basis for developing the training based on the feedback and experiences received from the practical pilotage assessment.

## **5.6 Measures that have been taken**

An overall reform of the Pilotage Act (940/2003) is being prepared by the administrative branch of the Ministry of Transport and Communications. The goal of the reform is ensuring the safety of navigation in particular. One of the key subject areas addressed by the reform is compulsory pilotage and the grounds for receiving an exemption from it. The criteria for granting and renewing a Pilotage Exemption Certificate are also studied as a part of the project. At the same time, special attention is paid to defining sufficient competence and the methods of verifying it.

## **SOURCES**

### **Written sources**

The Finnish Environment Institute (SYKE) (2018) *Analysis of Finland's Response Capacity for Environmental Accidents 2017–2025*

Satakunta Rescue Department (2020) *Öljyntorjuntasuunnitelma vuosille 2020–2024 (Oil spill prevention and response plan)*

Rescue Act (29.4.2011/379)

Border Guard Act (15.7.2005/578)

Maritime Search and Rescue Act (30.11.2001/1145)

Pilotage Act 940/2003

Environmental permit of the Port of Rauma 11/2007/2

Oil spill response and prevention plan of the Port of Rauma

### **Investigation materials**

- 1) Photographs, measurements and other materials from the site investigation
- 2) Weather information
- 3) Hearings
- 4) Timca - Grounding inspection on February 17, 2021 Rauma, DG-Diving Group
- 5) Regulations by Traficom concerning pilotage, pilot examinations and the voyage planning of vessels.

## **SUMMARY OF STATEMENTS REGARDING THE DRAFT INVESTIGATION REPORT**

The draft investigation report was submitted for comments to the Ministry of Transport and Communications, the Finnish Transport and Communications Agency, the Border Guard, Fintraffic Meriliikenteenohjaus Oy, the Finnish Meteorological Institute, the Satakunta Rescue Department, the Etelä-Kymenlaakso Vocational College, the Novia University of Applied Sciences, Finnipilot Pilotage Oy, the shipping company Spliethoff and the master of M/V Timca. A summary of the statements that arrived by the deadline has been drawn up, and it is presented below:

**The Ministry of Transport and Communications** states that the draft investigation report has paid attention well to certain development targets in the legislation on pilotage, such as the quality control of pilot training, development of the practical pilotage assessment and the use of simulators as a part of training. An overall reform of the Pilotage Act (940/2003) is being prepared by the administrative branch of the Ministry of Transport and Communications. The objective is to effect a comprehensive change in connection with reforming the Pilotage Act, and the aim is to pay attention to the factors mentioned above, among others. Cooperation between the Safety Investigation Authority as well as other authorities and stakeholders is important for achieving the goals of the project.

The preparations have taken into account that the ice conditions typical of Finnish waters may have a significant impact on the manoeuvrability of the vessel in a way that may come as a surprise to a crew that is not used to winter navigation. It is important that the holders of a Pilotage Exemption Certificate have sufficient winter navigation skills, and in fact, the project will assess different options of verifying this when granting personnel licences.

**The Finnish Transport and Communications Agency** suggested certain corrections to the section on the Pilotage Exemption Certificate related to the references to regulations required for the approval of a blank chart test. In addition, the statement described the status and content of the overall reform of the Pilotage Act.

**The Finnish Meteorological Institute** noted in its statement that it had no comments on the investigation report.

**The statement of the Border Guard was provided by the Border and Coast Department.** In its statement, the Border Guard further specified certain details concerning the authority for rescue operations and prevention of environmental damage. In its statement, the Border Guard noted that the regional rescue department had the authority for rescue operations and the prevention of environmental damage throughout the task, because the accident took place in the domestic traffic area II. Furthermore, the Border Guard specified that in practice, the participation of the Border Guard's Dornier surveillance aircraft in the task involved active preparation in order to determine the extent of a potential oil spill and ensure the investigation of a potential environmental accident.

**The shipping company Spliethoff** paid attention to certain technical details and items. In addition, in the interpretation of the shipping company, the ice conditions would have had a more significant impact with regard to the accident. In its statement, the shipping company also noted that the regulations issued by the Finnish Transport and Communications Agency with regard to issues such as voyage planning are not available in English.