Investigation report

C3/2009M

M/Y NINAMARIA II and S/Y ILONA, collision to the north of Vänö on 27 June 2009

Translation of the original Finnish report

SUMMARY

NINAMARIA II, a charter boat sailing under the flag of the United Arab Emirates, was journeying west from the Hiittinen Archipelago in the so-called icebreaker fairway and had reached the northeast side of Vänö island. The crew consisted of the Master and a cook. The Master was operating the boat single-handedly. The Finnish sailing yacht ILONA was sailing to the west on the same route in front of the boat. ILONA had a crew of two and was sailing down the wind with its sails spread open on two sides.

The difference in speeds between the two boats was approx. 10 knots, and NINAMARIA II was gaining on ILONA. The Master of NINAMARIA II had noticed the sailing yacht in front of him, determined that the best way to overtake it would be by the right and changed the setting of the autopilot 3 degrees to the right. The Master had then turned away to talk to the cook, who was in the cockpit, and failed to supervise the overtaking manoeuvre further. Instead of passing ILONA at a reasonable distance, NINAMARIA II collided into the stern of the sailing yacht.

The crew onboard ILONA had noticed that NINAMARIA II was approaching and gave hand signals to attract the Master's attention. At the last moment, the crew jumped overboard, thus avoiding the collision.

As a result of the collision, the bow of NINAMARIA II went across ILONA's open area, and ILONA was partly submerged under NINAMARIA II. ILONA's mast was broken and fell over as a result of the collision, and severe damage was caused to the hull of the sailing yacht. ILONA sustained serious damage, but NINAMARIA II escaped with minor damage considering the circumstances.

The rescue was poorly managed due to the passive approach of NINAMARIA II’s personnel. The crew of the sailing yacht was mainly rescued through their own actions, as they managed to climb up onto the stern deck of NINAMARIA II.

The Coast Guard made sure that the boats involved in the accident reached Kasnäs, where maritime rescue association volunteers took over further measures needed to look after ILONA and its crew. NINAMARIA II continued her journey without assistance and left the country before its involvement in the incident had been conclusively investigated.

The cause of the accident was NINAMARIA II's failure to keep a look-out at the crucial moment when the boats already were in a close-quarters situation, and the associated error of judgement in avoiding ILONA. The Master of NINAMARIA II had insufficient experience of navigation in the archipelago and an incorrect attitude to waterborne traffic safety. Shortcomings were also found in the ship managers' safety culture.

The investigators recommend that keeping look-out and the correct distance of giving way be highlighted in waterborne traffic, the safety plans and competency of large foreign vessels be inspected before the starting of operation, better after-care be ensured for victims of accidents and instructions be given to stop a vessel that is involved in an accident from leaving the country prematurely.

ABBREVIATIONS

RYA	Royal Yachting Association
GPS	Global Positioning System
GSM	Global System for Mobile Communications, mobile phone
VTS	Vessel Traffic Service

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FOREWORD

Approx. at 1.30 p.m. on 27 June 2009, the Accident Investigation Board duty officer was informed by the Marine Rescue Co-ordination Centre that on the icebreaker fairway Hanko–Utö, NINAMARIA II, a motor boat of the make Princess 20M sailing under the flag of the United Arab Emirates had collided with ILONA, a sailing yacht of the make Sunvind 311. The two persons manning the sailing yacht had saved themselves from the risk of injury by jumping overboard at the last moment. In the collision, the sailing yacht sustained severe damage, lost her mast and sails and sprung a leak in the Sail Drive unit. Within an estimated 10 minutes, the crew of the boat having caused the collision managed to assist one of the sailing yacht crew in climbing onboard their boat. Some five minutes later, the Master of the sailing yacht had also managed to board the stern deck of the boat having caused the collision. A motor boat that had arrived at the scene had alerted the Emergency Response Centre by a mobile phone.

A Coast Guard boat alerted to the scene towed the sailing yacht to the harbour of Kasnäs, and the motor boat having caused the collision followed with the sailing yacht crew onboard.

The crew of the voluntary maritime rescue association's rescue boat R/B PAROC was assigned the task of photographing the damage sustained by the boats and to conduct an initial investigation of the incident. Based on this investigation, the Accident Investigation Board decided to launch accident investigation C3/2009M. As the chairman of the investigation commission was appointed M.Sc. (Tech.) Klaus **Salkola** and as the member Pertti **Siivonen**. The investigation commission received significant assistance in its work from M.Sc. (Tech) Ville **Grönvall**. The investigation report was translated into English by Lingsoft Translations.

Statements concerning the investigation report. In accordance to the act (79/1996) 24 § concerning accident investigation the final draft of the report was sent for a statement to the Finnish Transport Safety Agency TraFi (Maritime Sector), Finnish Boating Association, Finnish Sailing Association, Finnish Navigation Association and The Finnish Border Guard (Headquarters) and for knowledge and comments to the Emergency Response Centre Administration, NINAMARIA II's owner and Master and ILONA's crew. On the basis of statements and comments, specifications were made in the investigation report. The statements received are attached to the investigation report's Finnish version.

Figure 1. NINAMARIA II after the accident.

Figure 2. ILONA after the accident.

1 EVENTS AND INVESTIGATIONS

1.1 Vessels

1.1.1 General information

Name	**M/Y NINAMARIA II**	**S/Y ILONA**
Make and model	Motor yacht Princess 20 M	Sailing yacht Sunwind 311
Nationality	United Arab Emirates	Finland
Owner	Yacht solutions LLC, Dubai *)	Privately owned
Length	21.74 m	9.37 m
Beam	5.23 m	2.90 m
Draught	1.42 m	1.45 m
Displacement	50 t	3 t
Machinery	MAN 2,300 hp (2 x 1,150 hp) **)	1 x 18 hp Volvo Penta
Speed	Top speed 30 kn Cruising speed 24/25 kn ***)	Approx. 5 kn

*) The company is Finnish-owned.

**) According to the shipping company's website, the engine power is 2 x 1,500 hp.

***) As the cruising speed of NINAMARIA II, the shipping company gives both 25 and 24 knots at their website.

ILONA was entered in the boat register of Kivenlahti Venekerho yachting association and inspected for the 2009 season. The boat was flying a Finnish yachting association flag.

According to a certificate produced by the Master, NINAMARIA II was entered in the COMMERCIAL TOURIST class in the register of commercial vessels of the United Arab Emirates in Dubai. An on-line advertisement indicated that NINAMARIA II was used in Dubai as a vessel that could be chartered out to tourists as part of the company's other tourism services. In 2009, the boat had been shipped to Sweden, from where it had come to Finland.

According to this document, NINAMARIA II was permitted to carry 17 passengers, and she was supposed to have a crew of two. As her traffic area was specified Coastal Area and Inside Ports. The item Foreign Going had been crossed out in the registration certificate. This registration had expired on 31 Dec 2008; in other words, NINAMARIA II did not have a valid registration for 2009. The vessel was sailing under the flag of the United Arab Emirates as the incident occurred. At the time of the incident, the ship manager was Yacht Solutions (L.L.C) based in Dubai.

1.1.2 Manning

NINAMARIA II was manned by a Master, who had a certificate of competency, and a cook. The Master had the following certificates of competency:

- RYA: Short Range Certificate, issued on 07/03/06.
- RYA: International Certificate for Operator of Pleasure Craft, valid for operating a motor boat up to 24 metres in length on inland and coastal waters, issued on 19/01/06.
- RYA/MCA YACHTMASTER OFFSHORE, issued on 20/12/07. In his sea protest, the Master claims that this document entitles him to skipper a motor yacht of up to 200 t on any passage during which the yacht is no more than 150 nm from a safe harbour.

The Master further reported that he had started his maritime training in 2007, and that at the time of the incident, approx. 60% of this training had been completed. At the time of starting the training, he had accumulated 7,000–8,000 nm of seatime. The Master claimed he had three years of experience of a boat equal in size to NINAMARIA II, of which 2,5 years were spent on the actual boat involved in the incident. The Master had had little seatime in the archipelago, or an estimated total of 200 nm, which he had accumulated on the voyage during which the collision took place.

The Master was operating the boat single-handedly. According to the operating licence issued by the maritime authorities in the United Arab Emirates (Dubai), the boat should have had a crew of two, and she was allowed to carry a maximum of 17 passengers. Before the incident, the shipping company advertised the vessel as normally operating in charter traffic with a crew of two seafarers and two serving staff. The boat had no crew list.

The passengers included a woman, who is according to information obtained by investigators, a representative of the ship managers/owners, three children, and a nanny. The total number of people onboard NINAMARIA II was four adults and three children.

ILONA had a crew of two (a man and a woman). The skipper had over 20 years of sailing experience, as well as specialisation and complementary training provided by the yachting association. The skipper had no actual certificate of competency, nor is one required for this type of yachting under the Finnish law. When sailing, the crew was always outside on watch.

1.1.3 Cockpits and their equipment

Equipment in NINAMARIA II's cockpit:

- Raymarine autopilot
- Furuno radar/GPS plotter
- Mg compass
- VHF radio
- Engine control instruments and control devices

Equipment in ILONA's cockpit:

- Magnetic compass
- Echo sounder
- Log
- Tiller steering

1.2 The accident event

1.2.1 Weather conditions

Sunny, wind from east–east-southeast approx. 4–5 m/s, good visibility.

1.2.2 The accident voyage

According to the Master, NINAMARIA II had left Emäsalo in Porvoo region at 8 a.m. on 27 May 2009 and headed towards the open sea, arriving in the archipelago via Hanko entry fairway. From here, she had continued across the western Hanko sea area south of Kasnäs along the so-called "icebreaker fairway" to the west, where her destination was in the Korposträm area. The Master was steering and navigating the vessel on his own in the indoor cockpit. The children with their nanny were indoors, the cook and the Master were in the saloon/indoor cockpit and the woman was in the outdoor cockpit.

The Master reported that the boat speed outside the archipelago had been approx. 20 knots, but as they entered the archipelago, the speed had been reduced to approx. 12 knots due to busy traffic. The Master also said he felt he was inexperienced in navigating in the archipelago, and as he was unaccustomed to the circumstances, he wanted to make sure of navigating correctly.

The sailing yacht ILONA had left Kasnäs and sailed west in the late morning. It was sailing down the wind, following the same "icebreaker fairway" from Hanko to Utö as NINAMARIA II. The two crew members were in the open area in the stern. They were sailing down the wind with the mainsail and the foresail open on opposite sides. The Master estimated that the boat was sailing at a speed of approx. four knots. The day was sunny and warm. The crew was dressed in very light clothing, and they were not wearing boating vests.

At the beginning of the situation leading to the incident, ILONA was further to the west and ahead of NINAMARIA II, having just passed the Vitgrund star buoys to the east of Vänö.

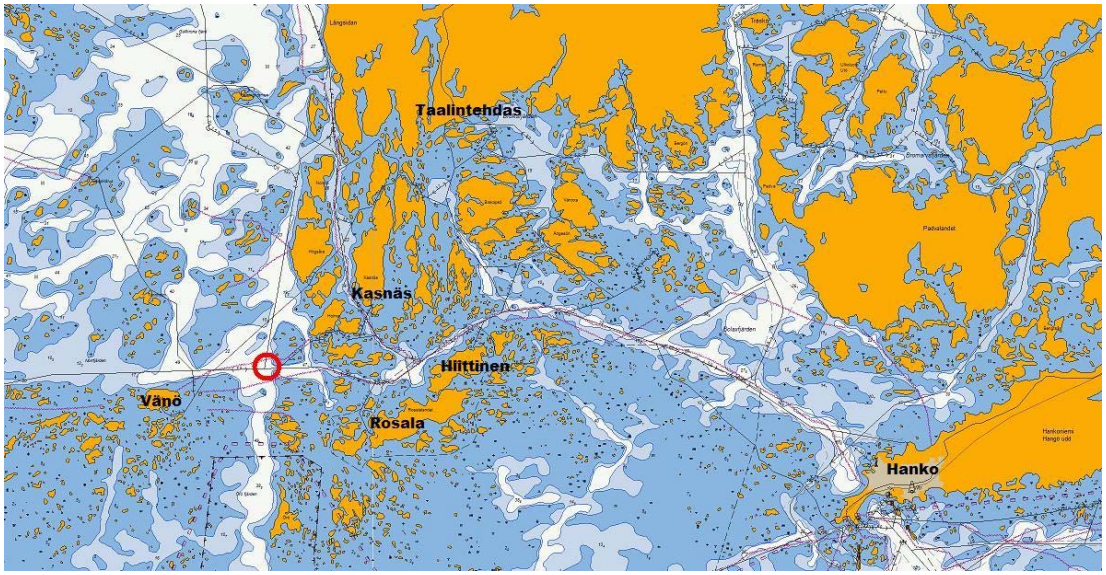

Figure 3. The red circle marks the scene of the accident. (Chart: Finnish Transport Agency)

1.2.3 Collision

ILONA's crew said they had observed the large motor boat approaching them from astern. They expected the boat to give way, and did not take any further action about the situation at that stage.

The Master reported that NINAMARIA II had just passed the Vitgrund star buoys in the icebreaker fairway when he observed the sailing yacht (ILONA) in front of him. To start the overtaking manoeuvre, the Master changed the autopilot setting by three (3) degrees to the right. At the time of the change of direction, the Master estimated that the sailing yacht was at a distance of some 50–100 m, slightly to the port side. After the change of direction, the Master of NINAMARIA II had been talking to the cook, who stood behind his left shoulder, and facing backwards to the left.

When the Master next observed the sailing yacht, a collision could no longer be avoided. When the Master once again turned to look ahead, he saw the sailing yacht immediately in front of the boat's bow. The distance left was very short, and nothing could be done to avoid the collision. NINAMARIA II collided into the stern of the yacht sailing in front of it.

The skipper of ILONA said he had noticed that the motor boat (NINAMARIA II) was on a direct collision course and tried to attract the attention of the operator by waving his arms frantically. The crew on the motor boat failed to notice the imminent risk, and the boat was approaching at a speed that was clearly faster than that of the sailing yacht. The skipper estimated the difference in speeds at almost 10 knots. At the last minute, the skipper of the sailing yacht made an attempt to avoid a collision by turning to the left, but the sail setting obstructed this manoeuvre. When a collision seemed inevitable, the crew sitting in the sailing yacht cockpit jumped overboard, according to their own

estimate approx. 5 seconds before the collision. As they jumped, they dived as deep in and far away as possible from the site of collision.

They reported that while they were submerged, they heard a loud commotion. When they came to the surface, they saw that their boat was floating without a mast and the motor boat that had caused the collision was still travelling on, but slowing down. Finally they saw the motor boat stop at an estimated distance of 200–300 m from the sailing yacht.

There was a motor boat in the vicinity of the scene, from which the incident had been observed almost without interruption. The man acting as the skipper of this boat was heard as an eye witness. The crew of another sailing yacht that was nearby did not see the actual collision, but after the incident it rushed to the scene. The Master of NINAMARIA II was heard in the sea protest proceedings in the Turku District Court after the incident, but as the vessel left the country soon afterwards, the investigation commission was not able to interview the Master further.

According to ILONA's crew, NINAMARIA II hit the swimming ladder in the middle of ILONA's stern, rose over the sailing yacht's transom on top of the yacht and its seating box to the right side, pressing the stern of the sailing yacht under itself. ILONA had listed to the right. It was claimed that the anchor of NINAMARIA II had hit ILONA's boom, and ILONA's mast had been left under the motor boat's pulpit.

The Master of NINAMARIA II could not describe the collision, except by saying that NINAMARIA II collided into ILONA's stern. He had no recollection of the mast falling down in front of him. On the other hand, he said he noticed that the sailing yacht passed along NINAMARIA II's left side.

The woman who had been sitting in the outdoor cockpit of NINAMARIA II reported that on hearing the noise of the collision, she first thought that they had hit a rock. After the collision, she immediately ran down to see what had happened. When she realised that they had hit another boat, they started reversing towards the sailing yacht and the persons who were in the water.

The operator of the motor boat who was interviewed as an eye witness reported that NINAMARIA II had been travelling at a steady speed until the collision with the sailing yacht, but the speed had been reduced a moment before the actual collision. The eye witness presumed that NINAMARIA had noticed the situation at the very last moment and tried to stop, however without succeeding.

At the end of the incident, ILONA was released from underneath the motor boat to the left and remained floating on the surface, without a mast and with the sails in the water.

Figure 4. A photograph taken from the Border Guard helicopter after the collision. At the time of taking the photograph, the persons who jumped overboard had managed to climb up. The fast motor boat mentioned above is moored to the port side of NINAMARIA II.

Figure 5. A photograph taken by an eye witness at the scene.

After the collision, the boats drifted further apart. NINAMARIA II stopped and, after a short delay, returned to ILONA, where the crew members having jumped overboard and recently surfaced were swimming without life jackets in sea water whose temperature was 15 degrees C.

1.2.4 Scene of the incident

The incident took place in the immediate vicinity of the 9 m Utö–Hanko fairway between Rosala and Vänö, at a distance of some 2 km to the west from Vitgrund spar buoys, slightly to the right (north) of the marked fairway. Slightly deviant reports have been given of the exact location. These deviations, however, are irrelevant to investigating the course of the incident.

As he reported the incident, the motor boat operator who was an eye witness gave the Emergency Response Centre the coordinates 59° 43’ N and 22° 18’ E, which presumably had been obtained from the boat's GPS system.

ILONA's skipper said that when he surfaced in the water, he was able to see the horizon when looking to the south. This is possible when looking to the south on the west side of Örö island at the scene.

The attached photograph was taken of NINAMARIA II's plotter view after the incident (Figure 6). The trace shows the path of the boat at the time the incident.

Figure 6. NINAMARIA II's plotter photographed after the incident.

1.2.5 Actions after the incident

According to eye witness accounts, the crew of NINAMARIA II seemed incapacitated immediately after the incident, and they did not take immediate, active action to rescue the crew members in the water. They did not put on life jackets, nor did they start using the rescue equipment. One person on NINAMARIA II was reported to be talking on a mobile phone. The others on NINAMARIA II stayed indoors or appeared otherwise to be avoiding any involvement in the incident. A man presumed to be the Master of NINAMARIA II was seen in the bow of NINAMARIA II examining the damage.

As the crew had managed to reverse NINAMARIA II back into the vicinity of the sailing yacht, they started assisting the woman in the sea in climbing to the swimming platform of the motor boat. Assisted by two persons, she was able to climb up to the stern deck of NINAMARIA II.

The man who had been onboard ILONA was clutching the side of ILONA. After being rescued, the woman told the crew to throw a rope to the man. After an estimated 15 minutes, the skipper of ILONA managed to lower the swimming ladder located on the stern deck of the motor boat and was also able to climb up onto the stern deck of NINAMARIA II. The use of the swimming ladder was hindered by a rubber dinghy located on the stern deck of NINAMARIA II.

The motor boat whose crew had witnessed the incident, and a sailing yacht that had observed the accident after it had occurred, arrived at the scene. After assessing the situation, the skipper of the motor boat having arrived at the scene decided on his own initiative to report the incident to the public emergency number 112 at 12.55 p.m.

At the scene, the Master of NINAMARIA II and the others involved in the incident managed to communicate in English.

After some time, a man who introduced himself as the husband of the passenger on NINAMARIA II arrived at the scene on a fast boat with an outboard engine. He started loudly criticising the persons on the motor boat, and stopped for a time to examine the situation with the other party to the accident. After this, he took the children who were on NINAMARIA II onto his boat and left the scene with them.

A Border Guard sea rescue helicopter happened to be in the vicinity, and it arrived at the scene at 1.13 p.m. The helicopter established that the emergency was over. After taking photographs of the scene, it left.

A tender from Coast Guard patrol vessel TIIRA arrived at the scene at 1.18 p.m and began to review the situation. After establishing that the situation was over and no-one was at further risk, and after conducting the required pre-trial investigation, it started towing the damaged sailing yacht to Kasnäs at 2.06 p.m. Before starting to tow the sailing yacht, the coast guards decided that the mast had to be detached. The mast with the sails was detached and allowed to sink to the bottom.

NINAMARIA II took the crew of the sailing yacht to Kasnäs.

In Kasnäs, the crew of the Finnish Life Boat Institution's rescue boat R/B PAROC, which the Accident Investigation Board had appointed to this task, documented the damage sustained by the sailing yacht, towed the leaking sailing yacht to Taalintehdas for docking and looked after the sailing yacht crew until they had found accommodation. The impression of the rescue crew was that the sailing yacht crew had found the incident very shocking, and even felt that their lives had been at risk. The threatening collision made a strong impression on the sailors.

The Coast Guard's mission was completed, once the persons had been rescued and put on land.

1.2.6 Personal injuries

The sailing yacht crew sustained personal injuries as they jumped overboard and were being lifted from the sea. The woman who was onboard ILONA had hurt her foot on the sailing yacht railing as she jumped overboard, and her left shoulder as she had been pulled up. At the same time, she sustained bruising and contusions in her lower limbs. Even in the light of the circumstances, the lifting method used by the rescuers was less than gentle on the person being lifted.

1.2.7 Damage sustained by the boats

After the collision, it was found that ILONA's mast had been broken in two places, and the mast support was broken. It was necessary to detach the mast with the sails and let them sink before towing. The stern rails were bent in and to the right. The damage sustained by ILONA was too serious to continue sailing.

Figure 7. A photo taken by an eye witness of ILONA's stern soon after the collision.

The crew of R/B PAROC later found that ILONA's transom had been pushed in, and the structure had fractured over the whole width of the boat. As the back part of the cockpit had been pushed in, the rudder axel had been bent forward. Deformations were found in the fixing and support irons below the axel. The axel feed-through in the hull was leaking. As a result of the violent collision, the engine may also have swung, and the hull was de laminated in the stern. The yacht's chain plates were also exposed to great forces, and the delamination of the hull structure was likely.

ILONA was later examined by a goods inspector. Based on this inspection, it was assessed that repairing the sailing yacht would not be cost-effective.

In connection with this investigation, the damage sustained by NINAMARIA II was not examined in detail. Based on observations made, however, it is known that the pulpit was bent onto the fore deck, one rail support was pulled off the deck, and the other supports were knocked down. Scratches and scuff marks were observed in the reinforced plastic. In the submerged parts, damage to the paint could be observed down to a depth of approx. 40 cm, at an estimated distance of 5 m from the bow towards the stern. Scratches could be observed over the whole length of the boat all the way to the stern on the port side.

The Master of NINAMARIA II assessed the damage sustained by the boat to be so negligible that he decided to continue to Kasnäs without assistance. According to the information received, after approximately one week the boat left Finland, and the sea protest issued by the Master's solicitor indicates that it was transferred to a new owner. The Finnish Maritime Administration did not issue an opinion on whether the boat was seaworthy or not. No Finnish authority stopped the vessel from leaving the country.

Figure 8. The bow of NINAMARIA II after the collision (photograph taken by the crew of R/B PAROC).

Figure 9. Pulpit of NINAMARIA II after the collision (photograph taken by an eye witness).

1.2.8 Other damage

ILONA's yachting holiday came to an end, and NINAMARIA II's cruise was interrupted.

The sailing gear of ILONA's crew became redundant, as the shock caused by the incident has since prevented the owners from pursuing sailing as a hobby.

1.2.9 Recording instruments

The path of the vessel was displayed on NINAMARIA II's plotter when the vessel was inspected. The display screen of the instrument was photographed. See Chapter 1.2.4, Figure 6.

ILONA had no positioning system, such as a GPS device, that would register the yacht's path.

1.2.10 Fairway and aids to navigation

The scene of the incident was on the 9.0 m Utö–Hankö fairway, or the so-called icebreaker fairway. The fairway is well marked with leading marks and ice buoys.

1.3 Rescue operation

1.3.1 Emergency response

The parties involved in the incident neither called for help nor reported the incident to the authorities.

The emergency call was placed by the skipper of a motor boat that was not involved in the incident. He made the call on his mobile phone after he had been at the scene for some time and, i.a. the crew members had been rescued from the sea. It was estimated that the emergency call was made no earlier than 15 minutes after the actual incident, at which time the situation already was under control. This call was received by the Emergency Response Centre at 12.55 p.m.

The contents of the emergency call were mainly as follows:

- After the Emergency Response Centre replied, the caller discussed the incident with the operator for 3 minutes and 57 seconds.
- The operator discussed the matter with the Maritime Rescue Co-ordination Centre for 50 seconds.
- The caller discussed the matter with the Maritime Rescue Co-ordination Centre for 2 minutes and 32 seconds.
- The caller's phone log indicates that the total length of the call was 7 minutes and 19 seconds.

Based on the emergency call recording, the Emergency Response Centre operator was struggling to make out where the scene of the reported incident was, and the place was confused with other locations that were clearly incorrect. The positioning coordinates given by the caller did not help the operator in this respect, and neither did the caller give the location of the incident in fully unambiguous terms, but he did manage to give the coordinates with an adequate accuracy of one minute.

After first talking to the caller, the Emergency Response Centre operator contacted the Coast Guard and passed on the coordinates given by the caller, after which the authorities finally had established the exact location where the incident had taken place. The recording indicates that the call from the Emergency Response Centre took 3 minutes and 57 seconds.

After getting in touch with the Maritime Rescue Co-ordination Centre, the caller had to describe the incident again from the beginning. According to the log file on the caller's phone, the duration of the call needed to report the incident was 7 minutes and 19 seconds in total.

NINAMARIA II had a VHF radio and several mobile phones onboard. These were not used to make an emergency call. The occupants of the boat were seen using their mobile phones, but they were not placing an emergency call to the authorities. After

some time, a man who introduced himself as the passenger's husband arrived in a fast white boat with an outboard engine as described in section 1.2.5. After being informed that the emergency call had been made by a bystander and discussing the matter for a minute he left the scene as described above.

1.3.2 Launching of the rescue operation

The crew members in the sea were rescued before the emergency call was made.

Several eye witnesses had the impression that the personnel on NINAMARIA II were in the beginning unable to help those in danger. The people on the boat did nothing but "mill around" on the deck. This was presumed to be due to the shock caused by the incident. The rescue progressed slowly. No life buoys or ropes could be seen in the water, and the crew members in the sea had to fend for themselves. On NINAMARIA II, no-one was directing the rescue operation. The passengers who were inside did not take part in the rescue. The woman rescued from the sea had for her part acted with initiative and got the crew to help the man, who remained in the water and was struggling to use the ladders.

There was a rubber dinghy on the swimming deck of NINAMARIA II. This had obstructed the use of the ladder that can be lowered into the water. Despite this, the woman who had jumped overboard from ILONA had earlier been able to get up. The man on NINAMARIA II helped the woman to move the rubber dinghy that was on the stern deck, after which the man remaining in the water was able to use the ladder and managed to climb up.

Maritime rescue units were called to the scene. A Coast Guard sea rescue helicopter arrived at the scene, took photographs and then left. A Coast Guard tender later arrived at the scene and took control of the situation. The Maritime Rescue Co-ordination Centre alerted Hiittinen boat patrol and a patrol from patrol vessel TIIRA. The person having placed the emergency call was given permission to leave the scene.

1.3.3 Evacuation of passengers

The husband of one of the passengers, who had turned up at the scene, evacuated the children on NINAMARIA II. The adult passengers and the crew stayed onboard.

The crew of the damaged sailing yacht remained on the motor boat. They were taken to Kasnäs, where a Finnish Lifeboat Institution unit looked after them. ILONA was also towed to Kasnäs. The persons onboard NINAMARIA II, excluding the children, came to Kasnäs on the boat.

1.3.4 Salvaging of the yacht

While the emergency call was still in progress, NINAMARIA II tried to tow ILONA. The Coast Guard asked them to stop, at which point the attempt at towing was abandoned.

The damage sustained by NINAMARIA II was so minor that the boat was able to leave the scene without assistance.

ILONA was salvaged by being towed by a Coast Guard boat to Kasnäs. In Kasnäs, a leak was found, and the Finnish Lifeboat Institution unit thus towed the yacht to Taalintehdas, where it was immediately hoisted out of water.

1.4 Detailed investigations conducted

1.4.1. Technical investigations

On request of the investigators, rescue boat R/B PAROC of the Finnish Lifeboat Institution Sydväst went to document both the damage sustained by ILONA on the day of the incident in Kasnäs, and that sustained by NINAMARIA II in Korpoström area the following day. They prepared reports of their observations and interviews conducted for the investigators.

No other detailed technical investigations were conducted during the investigation.

1.4.2 Clothing of the crew and passengers

Both crew members on ILONA who were rescued from the sea were wearing swimwear or similar, and neither was wearing a life jacket. No life jackets were worn on NINAMARIA II, and the persons on the boat were wearing light summer clothing.

1.4.3 Alcohol

The Coast Guard breathalysed the skippers of both boats. The result of both tests was zero per mille.

1.4.4 Organisation and leadership

The safety culture of NINAMARIA II's ship managers and the associated functions were not covered by this investigation, as the activities were those of a charter-type pleasure craft in their nature, and as NINAMARIA II left the country soon after the incident.

ILONA is a typical family-owned pleasure yacht. The safety culture on ILONA was similar to the prevailing culture on sailing yachts of the same type.

1.5 Rules and regulations applicable to the operations

The Act on technical safety and safe operation of vessels (alusturvallisuuslaki, 29.12.2009/1686) applies to Finnish vessels in commercial operation. Commercially operated vessels under a foreign flag must comply with international (IMO) rules and the regulations of their own flag state.

Provisions on Finnish chartered boats are laid down in the Decree on the safety of chartered boats (asetus vuokraveneiden turvallisuudesta, 20.5.1983/438) and the Finnish Maritime Administration's decision on the safety of chartered boats 15.12.1997, record nr 9/30/97. These specify twelve as the highest number of passengers on a chartered boat. According to its documents, NINAMARIA II was registered for 17 passengers. Based on IMO definitions, this would make it a passenger vessel.

The rules do not actually prevent the optional use of a chartered boat as a pleasure craft, nor the use of hired crews on a pleasure craft. The largest number of people allowed on a pleasure craft is twelve. The investigation was unable to find information about corresponding rules in NINAMARIA II's flag state.

1.5.1 Duty to give way

The duty to give way is regulated in the international rules of the road at sea: the Decree on the enforcement of the Convention on the International Regulations for Preventing Collisions at Sea adopted in 1972, 30/1977.

These rules define the duty to give way applicable to this incident as follows:

Rule 13, Overtaking

(a) Notwithstanding anything contained in part B, sections I and II, any vessel overtaking any other shall keep out of the way of the vessel being overtaken.

Rule 18, Responsibilities Between Vessels

Except where Rules 9, 10 and 13 otherwise require:

(a) A power-driven vessel underway shall keep out of the way of:

...

4) A sailing vessel.

The rules also lay down the following obligations:

(a) Any action to avoid collision shall, if the circumstances of the case admit, be positive, made in ample time and with due regard to observance of good seamanship.

(b) Any alteration of course and/ or speed to avoid collision shall, if the circumstances of the case admit, be large enough to be readily apparent to another vessel observing visually or by radar; a succession of small alterations of course and/or speed should be avoided.

(c) If there is sufficient sea-room, alteration of course alone may be the most effective action to avoid a close-quarters situation provided that it is made in

good time, is substantial and does not result in another close-quarters situation.

(d) Action taken to avoid collision with another vessel shall be such as to result in passing at a safe distance. The effectiveness of the action shall be carefully checked until the other vessel is finally past and clear.

(e) If necessary to avoid collision or to allow more time to assess the situation, a vessel shall slacken her speed or take all way off by stopping or reversing her means of propulsion.

(Rule 8, Action to avoid collision).

1.5.2 Crew competency requirements

No detailed provisions apply to crew competency as regards the Finnish sailing yacht (ILONA).

Regarding a pleasure craft up to 24 m in length (NINAMARIA II), the only requirements applicable in Finland are that the operator is at least 15 years old and able to operate the boat in question. As NINAMARIA II was a foreign commercially operated boat, any crew competency requirements set by the flag state apply to it.

1.5.3 Safety management system

IMO Resolution A.741 and SOLAS Chapter IX.

Chapter 1 Section 8 of the Finnish Maritime Act that was valid at the time of the incident contains the following provision on the ship managers' safety management system: *Finnish ship managers and foreign ship managers engaging in commercial shipping in the Finnish territorial waters shall have a safety management system aiming to develop and maintain vessel safety on the ship managers' vessels.*

The managers (of a passenger vessel) *shall have a safety management system that is compliant with the ISM Code. The ISM Code shall not apply, however, to a passenger vessel in domestic traffic and its ship managers, if the largest number of passengers permitted on the vessel is less than 100 persons.*

1.5.4 Orders and instructions issued by the authorities

The investigation did not establish what manner of obligations a foreign commercial or pleasure craft such as NINAMARIA II, and especially one not based in an EU and Schengen Member State, has to comply with local regulations and customs.

No orders by the authorities applicable to foreign charter boats have been prepared in the European Union.

After entering the Schengen area, no restrictions as to their movements or operation apply to foreign charter boats, nor do they have a duty to report their planned movements or schedules. A vessel safety plan is not required, nor is its existence controlled.

To such imports of pleasure crafts for temporary "personal use", the procedure for temporary admission is applied by the Customs. A formal consultation with the customs administrations of the Member States is a prerequisite for using a charter boat imported in the Schengen area. Under the temporary admission procedure, the maximum period for using a vehicle on sea and inland waterways traffic is 18 months.

1.5.5 Operator rules

The investigators are not aware of any rules issued by the operator of NINAMARIA II. Regarding ILONA, such rules cannot be required.

1.5.6 Quality systems

Neither party had a quality system in place.

1.6 NINAMARIA II's departure from Finland

In the days following the incident, NINAMARIA II left Finland and was sold to a new owner. The boat was not available for a more detailed investigation. The investigators were left with the impression that after the boat was sold, the ship managers no longer had any property or other securities in Finland that would have enabled them to respond to any claims for compensation arising from the incident.

2 ANALYSIS

2.1 Manning

The manning of ILONA by two crew members was adequate. A sailing yacht of this size range can be sailed by two adults, and on a one-day sail, two persons are sufficient to look after navigation.

The manning of NINAMARIA II was incomplete, as the maritime staff comprised of the Master alone, and neither did the Master order the cook or any other person to assist him by keeping a look-out when navigating on archipelago fairways.

The certificate of registration shows that the minimum crew of the vessel consists of the Master and a deck hand. This criterion was not met on the voyage on which the incident took place.

On the Internet, the shipping company states that the boat's manning is two seafarers and two catering staff. On the voyage on which the incident took place, NINAMARIA II clearly had less than the manning specified by the shipping company.

After realising that keeping look-out was challenging in this situation, the Master should have ordered more persons to look-out duty to assist him. Primarily, the cook should have been ordered to perform this task, and secondarily any persons selected by the Master among the passengers on board. Alternatively, the speed should have been significantly reduced, or the voyage abandoned. Keeping adequate look-out alone could have helped to prevent the whole accident.

The Master was operating the boat from the indoor cockpit, even if he had an outdoor cockpit that offered considerably better visibility at his disposal. This cockpit, however, was being used by the passengers. It is not known whether this arrangement was the Master's own decision or ordered by the shipping company. Operating the boat from the inside cockpit was, however, an error in the prevailing circumstances. If necessary, the Master should have removed the passengers from the outdoor cockpit and ensured that it was only used for steering the boat.

One of the managers of the shipping company that owned NINAMARIA II was onboard as a passenger, and she could have intervened in the situation. She did not intervene in the obvious problems of keeping look-out that the Master was facing, however, nor did the Master request from the shipping company representatives onboard for a look-out to assist him or for the use of the outdoor cockpit.

2.2 Seamanship

The crew onboard ILONA had sufficient competency and experience for sailing the yacht in the prevailing conditions.

The Master of NINAMARIA II had a British certificate of competency to operate a motor boat up to 200 t on any passage during which the yacht is no more than 150 nm from a safe harbour, and other seafaring qualifications. In this regard, he did have a formal competency to skipper NINAMARIA II during the voyage on which the incident took place. The Master of NINAMARIA II did not have experience of the tasks of a crew member or First Mate when sailing in the archipelago, however, and without prior training, he had started building up his practical skills in archipelago shipping by skippering NINAMARIA II in Finnish territorial waters. The Master claimed that he had thus accumulated seatime totalling approx. 200 M in Finland, which comprised NINAMARIA II's voyage until the time of the accident.

Even if the Master had adequate formal competency and theoretical skills in operating his boat under the terms of the British operator card, he did not apply his learning in practice when navigating in Finland. A short stay of 1 to 2 weeks in Finland does not give adequate skills to Master navigation in archipelago waters and the Scandinavian yachting culture. In the investigators' opinion, he did not have the experience of archipelago navigation required to operate a large motor boat, such as NINAMARIA II, single-handedly. He also said afterwards that he was uncertain about navigating in narrow fairways. In a situation of this type, a person should understand the limitations of his or her skills in operating a vessel. Other solutions to ensure safe navigation should have been sought, rather than operating single-handedly.

2.3 Vessels

Each vessel was suitable for its purpose of use.

2.4 Regulations

The rules of the road at sea clearly and unambiguously specify the actions and obligations of the vessels in this case. This incident does not give cause to change the give-way rules. The accident could have been prevented by compliance with the give-way rules.

Sections 5 and 6 of the Maritime Transport Act (Vesiliikennelaki 20.6.1996/463) contain such as the following provisions:

Each person operating a watercraft shall act cautiously and carefully as required in the conditions, ensuring that he or she does not without a compelling reason obstruct or disrupt other waterway users, nor cause danger or damage to others, nor danger or significant or unnecessary nuisance or disruption to the nature or other environment, fishing, general recreational use of the environment or other public or private interest.

The operator of the watercraft shall comply with the rules of the road applicable to waterborne transport and orders, prohibitions and restrictions indicated by waterborne traffic signs or signal lights.

A person who is not old enough or does not have adequate ability or skills considering the circumstances shall not operate a watercraft.

A motor powered watercraft subject to a registration duty may only be operated by a person who is 15 years old or older.

Compliance with these provisions alone would have prevented the accident.

If complied with, these provisions are adequate to avoid similar incidents.

2.5 Chain of events as regards NINAMARIA II

Before the incident, the boat had been travelling on the fairway crossing the archipelago of Kasnäs–Rosala. This would be a challenging task requiring plenty of care for a Master not accustomed to the archipelago. After reaching more open waters to the west of this area, the Master had felt he was free from the pressures of navigating in the archipelago, and his level of alertness dropped. The boat's cook had come to talk to the Master in the cockpit, and the two were having a conversation. The Master was turned towards left and the stern, and did not actively keep a look-out in the direction the vessel was travelling. As a result of this, keeping a proper look-out was neglected.

After seeing the sailing yacht in front of him, the Master neglected his duty to analyse in detail the potential collision course of the boats, and contented himself with a routine and inadequate alteration of direction by 3 degrees. He kept on talking to the cook, and no longer monitored the imminent passing of ILONA. The autopilot was steering the boat in the new direction set by the Master, which was only nominally different from the original course.

The situation assessment carried out by the Master of NINAMARIA II after observing ILONA was rushed, and the alteration in direction was too minor to prevent the boats from getting too close to each other. The change in direction was also much too insignificant to be clearly interpreted by the other party, or ILONA. Navigationally, there was no reason why NINAMARIA II could not have made a major alteration in its course to give way to ILONA.

NINAMARIA II collided into ILONA's stern in a situation where it was no longer possible to do anything.

According to eye witnesses, NINAMARIA II reduced her speed at the moment of collision, but the boat still travelled on for some time before stopping. The reduction of speed at the moment of impact was a result of the collision. The only reason for the long distance it took for NINAMARIA II to stop could be that after the collision, the engines of

the boat were still running forwards, and the propellers were only stopped later after the collision.

No fault was found in the engine control system on NINAMARIA II (remote control device). Consequently, the boat would have stopped immediately after the Master took hold of the controls. However, the boat was not stopped immediately as a result of the collision. Possible reasons for this could be the shock felt by the Master and his loss of functional capacity as a result of the collision, or the fact that the Master was not in the cockpit in the immediate vicinity of the controls at the time of the incident. This may have been caused by the impact as such, or the fact that the Master may have actually left the controls after making the minor alteration in the course.

Calculation of distance and time

The exact course followed by NINAMARIA II from Emäsalo to the scene of the incident is not known. In his maritime declaration, the Master says they had travelled outside the archipelago up till Hanko. After this, they had followed archipelago fairways to the scene. The distance of this voyage is roughly 120 nm, of which 20 nm is in the archipelago. This distance would be 115 nm following the fairways through the archipelago.

The Master reported that their speed had mainly been the cruising speed of the boat, which was reduced to 12 knots in the archipelago. As the speeds at which the boats approached each other and collided are significant for the investigation, the calculation below verifies that the speeds mentioned are realistic considering the total length of the day's voyage.

According to the sea damage claim, NINAMARIA II left Emäsalo, Porvoo at 8 a.m. in the morning. The accident took place at 12.40 p.m. If the boat travelled 100 nm at the speed of 25 knots and 20 nm at the speed of 12 knots, the times of the different legs can be calculated as follows:

Open sea 100 nm / 25 knots = 4 hours

In the archipelago 20 nm / 12 knots = 1 hour 40 minutes

Total time of the voyage 5 hours and 40 minutes.

This would indicate a departure time of 7 a.m. from Emäsalo, which is contradictory to what the Master claimed in the maritime declaration.

If the boat had been travelling at a speed of 25 knots for the entire distance, the travelling time would have been:

120 / 25 = 4 hours and 48 minutes.

In that case, the departure from Emäsalo would have been about an hour earlier, which is consistent with the Master's report.

The speed calculation shows that the speed of 12 knots in large stretches of the archipelago reported by the Master of NINAMARIA II was not quite realistic based on these schedules. The reduced speed may, however, have been used at the moment of impact and momentarily elsewhere in difficult areas of the archipelago. An eye witness estimate of NINAMARIA II's speed at the time of impact supports this idea.

Master's alertness level

At the time of the accident, the Master of NINAMARIA II had been on watch single-handedly for 5 hours or more, considering the preparations for departure and casting off. If we also take into consideration the early departure, the Master's inexperience in navigating in the archipelago and the uncertainty he felt due to the busy traffic, his level of alertness could no longer be considered to be at a particularly good level when the accident took place. His level of alertness was lowered by the fact that he did not show nearly enough interest in observing the progress of the boat, and allowed his conversation with the cook occupy nearly all of his attention. What may have been a contributing factor in this was that when reaching more open waters after the tight-knit archipelago area of Kasnäs–Rosala, the Master felt that the situation requiring his alertness was over, and he erroneously thought that he could allow the boat to travel without keeping an eye on it. It was not possible to reach the boat's cook in connection with the investigation, which is why it has not been established where in the boat the various persons actually were at the time of the incident, and if such factors as the higher seas after the archipelago had resulted in the Master focusing on a task that was not relevant to steering. However, after the last turn of the fairway, no-one on NINAMARIA II was keeping adequate look-out or assessing the navigational situation. The boat carried on blindly in the direction set on the autopilot towards the collision.

2.6 Chain of events as regards ILONA

ILONA had embarked on a holiday trip and was sailing in sunny weather. Navigation was based on following the map and visual observation of the maritime landmarks. Navigation in the water area in question was not particularly challenging to the crew of ILONA, and the crew members in the slow-moving boat concentrated on enjoying sailing down the wind and sunbathing. They had neglected to put on life jackets recommended for sailing, and they wore extremely light clothing. The man who was steering the boat was keeping look-out in the bow direction, and the woman who was sitting in the open area facing backwards was keeping look-out in the stern direction. Keeping look-out was thus well organised on ILONA.

As NINAMARIA II did not approach ILONA from the direction of the sails, the crew of ILONA spotted it easily. The large motor boat approaching from the stern was observed, and the crew appropriately started monitoring the situation. The crew knew that a motor powered vessel approaching from behind had the primary duty to give way, and they took no action of their own to give way. The direction of ILONA was kept steady, while the speed naturally varied with the wind.

Once they concluded that the motor boat had not noticed ILONA, or at least not taken adequate and visible action to give way, the crew of ILONA started giving hand signals to attract attention. These did not have any impact on the progress of the approaching motor boat. In the end, they decided to give way by turning left. This did not succeed, however, as with the sail setting in use, the yacht was impossible to steer. In a following wind, ILONA could not be turned by the tiller.

There was not enough time to turn on the engine to assist the manoeuvre. ILONA had no means of preventing the collision.

Once the collision seemed inevitable, the crew of ILONA decided to jump overboard from the open deck area to the left of the boat, as they determined the impact was going to be on the right side. NINAMARIA II hit ILONA's transom, and her bow passed across the open deck area of the yacht, pressing ILONA's stern part deeper into the water. Had they remained in the open area, the crew members would have been seriously, and possibly fatally, injured in this situation. Jumping overboard saved ILONA's crew. The crew members onboard ILONA were also lucky in that NINAMARIA II did not at the very last moment give way to the left. This direction of giving way could have been possible in the circumstances.

The lack of life jackets made it possible for ILONA's crew to dive deep into the water after they jumped. In principle, this had a positive impact on the outcome. However, the time they stayed underwater would in any case have been short, and it would have been a lucky accident if NINAMARIA II had travelled over them at the very moment they were sufficiently deep under water. At the speed NINAMARIA II was travelling, the pressure effect of the hull and suction effect of the propellers would have extended over a large area, and it would still have been possible for the persons who had dived in to become crushed by the propellers. On the other hand, the lack of life jackets undermined their possibilities of survival after the impact. Fortunately no lives were lost in this incident.

2.7 Collision

The location of the scene of the collision is slightly inaccurate. The position coordinates given in the emergency call presumably were slightly off the scene of the collision due to the boats drifting after the incident. The plotter trace on NINAMARIA II shows that the boat had turned right as a result of the collision and then travelled on for some distance before stopping and turning back. As the scene of the incident can be regarded the position where the trace in NINAMARIA II's plotter turns right.

NINAMARIA II was clearly approaching ILONA within the 135° stern sector specified in the rules of the road at sea, in which the approaching vessels is considered as the gaining one, and it has the duty to give way to the vessel it is gaining on.

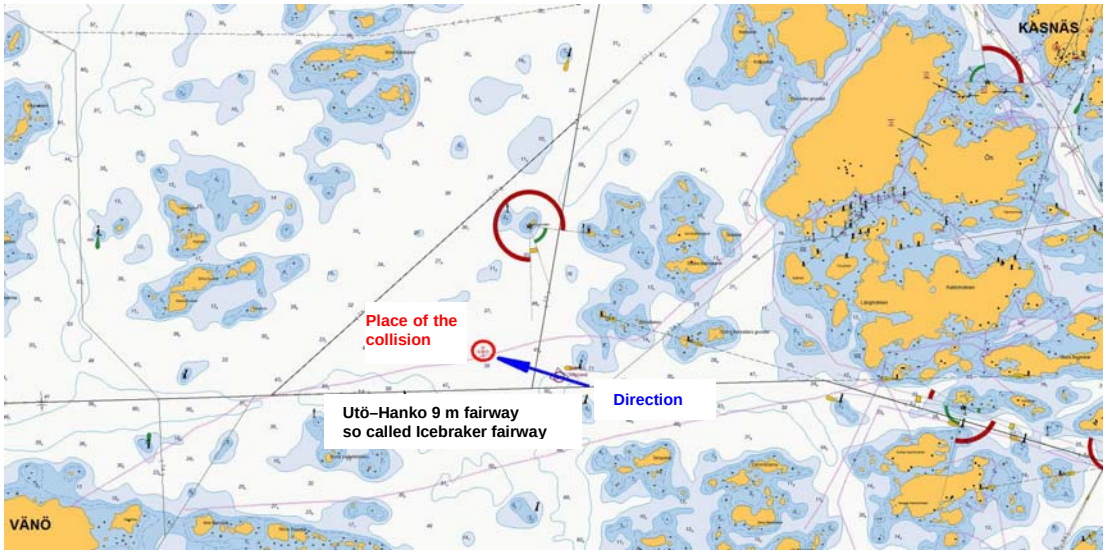

Figure 10. The investigators' opinion of the site of collision. (Chart: Finnish Transport Agency)

The reduction in NINAMARIA II's speed observed by an eye witness before the collision was due to slowing down caused by the impact on ILONA's mass. The eye witness was far away from the scene, and could not necessarily observe whether the impact and reduction of speed took place simultaneously or not.

NINAMARIA II hit ILONA almost in the middle of the stern on a course that was an estimated 10–15 degrees from behind and left. The bow had gone inside the edge of the cockpit, and the motor boat had partly risen on top of the sailing yacht. The stern of the sailing yacht had then been pressed down under the weight of the motor boat and moved left. NINAMARIA II's bow had broken the stays holding up the mast, and the bow had hit the boom/mast. As a consequence, the mast had broken and fallen into the sea. The sailing yacht brushed along the left side of the motor boat and was thrown further away.

The directions of the boats were already slightly different at the beginning of the situation. It is possible that, based on his short and rushed glance, the Master of NINAMARIA II had estimated that ILONA would have time to pass in front of his bow to the left. This is also supported by his decision to only slightly alter the direction to give way.

2.8 Approach of the boats and visibility to one another

If we presume that ILONA's speed was 4 knots and NINAMARIA II's 12 knots, the mutual positions of the boats can be reconstructed as shown in the attached map. This examination is approximate, but accurate enough to clarify the fact that ILONA had been visible to NINAMARIA II for some quarter of an hour before the collision, and that in practice, ILONA was directly or nearly directly in front of NINAMARIA II's bow the entire time. In practice, ILONA had been visible even before this, as its sail could be seen across the islet of Södra Bärsskärsgrundet.

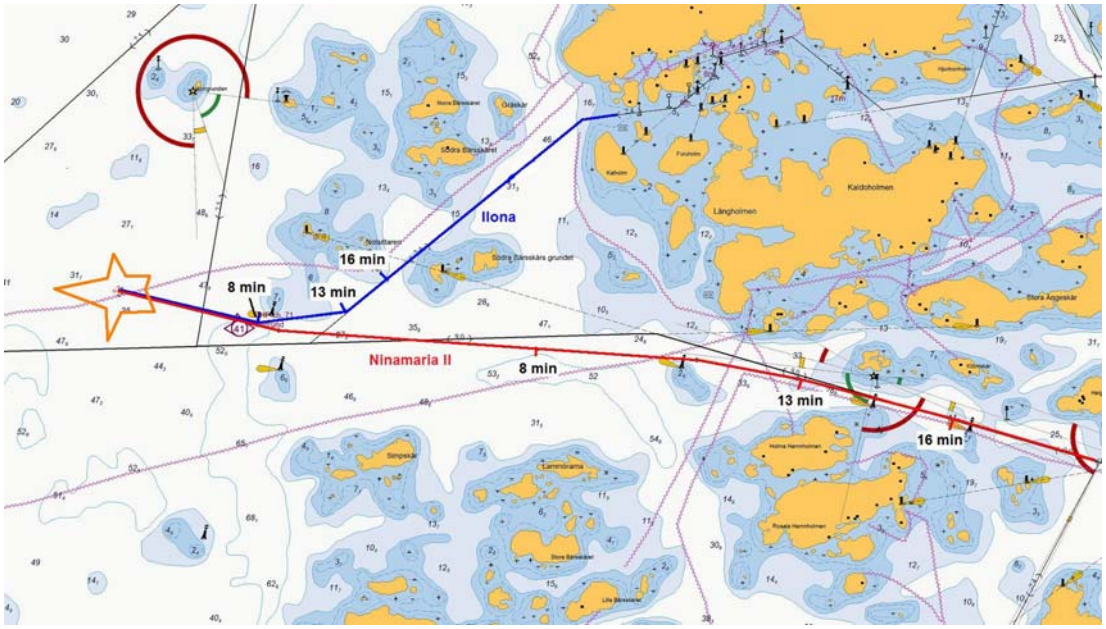

Figure 11. An approximate estimate of the boat's courses before the collision. ILONA was sailing from northeast and NINAMARIA II from east-southeast. The courses of the boats meet near the Vitgrund spar buoys. The Figure shows the positions of the boats 8, 13 and 16 minutes before the collision. This examination indicates that ILONA was visible to NINAMARIA II in the bow sector for at least quarter of an hour before the impact. (Chart: Finnish Transport Agency)

ILONA could not have appeared in front of NINAMARIA II suddenly and without warning. The fact that the sailing yacht in reality was only observed in the last moments in the situation shows that the Master of NINAMARIA II completely failed in his task of operating a motor boat in the Finnish archipelago. The Master's attitude to his task was irresponsible.

2.9 Possibilities of avoiding a close-quarters situation

The nine-metre icebreaker fairway is naturally wide, and in practice, the water area at the scene of the accident is also open and navigable for wide stretches outside the fairway area. Even staying within the fairway area, NINAMARIA II would have had an excellent opportunity to select a course that would have avoided a close-quarters situation. In these waters, even a wide manoeuvre to give way would not have risked the safety of the vessel. Neither were there any other craft in the area that would have interfered with a careful manoeuvre to give way.

2.10 Keeping look-out

It would have been impossible not to see the sailing yacht travelling in front of the bow with fully spread sails when looking out through the windscreen on NINAMARIA II. The mast of the sailing yacht is so high that a large share of sail surface is within the field of

vision. The white sail would also have been clearly visible against the backdrop of the sky and the sea.

The weather was clear and sunny. In this regard, there was excellent visibility that would have facilitated spotting ILONA throughout the situation and even much further away, if NINAMARIA II had been keeping a look-out at all.

The sun was in the south, and the light thus came from the side. This may to a small extent have affected the vision of NINAMARIA II's Master, especially if he was turned left towards the sun. Immediately after the impact, the Master of NINAMARIA II had told the woman who was onboard that because of the lighting conditions, he had not seen the sailing yacht, and that reflections made it difficult to see out from the cockpit. Despite this, he had continued to operate the boat from indoors. It is likely, however, that the darkened windows together with a boat that was designed for sunny waters would have prevented any actual loss of visibility. In any case, the Master should have taken the sun into account and by means of correct equipment, keeping a closer look-out and reduction of speed ensured that the boat could operate safely.

Inability to see ILONA from NINAMARIA II could not have been the cause of the accident. However, the crew failed to observe the sailing yacht. The only reason for this could be a complete failure to keep look-out on NINAMARIA II after the change of direction. The keeping of look-out prior to this must also have been so inadequate that the Master was unable to perceive the situation leading to the collision. NINAMARIA II completely failed to conceive the critical nature of the situation.

Figures 12 a and 12 b show the field of vision of NINAMARIA II's operator towards the bow both from the indoor and outdoor cockpit. The Figures clearly show how much easier it is to keep look-out from the outdoor cockpit in the direction the boat is travelling than from the indoor one. The windscreens that are tilted back produce a strong mirror effect, and the field of vision is narrow and low. When the yacht is on the run, the trim of the hull further increases the difference from the situation shown in figures.

Figure 12 a. View from NINAMARIA II's indoor cockpit.

Figure 12 b. View from NINAMARIA II's outdoor cockpit.

2.11 Actions of the other personnel on NINAMARIA II

The account of the woman who was sitting in the outdoor cockpit is inconsistent. On one hand, she said she was keeping an eye on the progress of the boat, or was in principle acting as a look-out. After the collision, however, she thought at first the boat had hit a rock. Only after she got down and talked to the Master did she find out that NINAMARIA II had actually hit another boat. This shows that the woman was on the boat in capacity of a passenger. If she was performing the task of a look-out on sea watch in the event, she completely failed in this task.

The cook of NINAMARIA II was performing tasks for which he had received training during the voyage. The investigation has not found anything to indicate that navigation tasks had been assigned to the cook, in addition to possible duties while casting off and mooring.

2.12 Alteration of direction when giving way

When a vessel is giving way to another vessel, the purpose of the alteration of direction is not only to prevent the vessels from colliding or passing too close to each other, but also to give the other party an indication of the kind of manoeuvre the vessel is undertaking. If the change of direction is inadequate, the other party does not necessarily understand that the party giving way has the situation under control. For reference, we can state that in most situations, changes of direction that are less than 15 degrees are difficult or impossible for the other party to interpret correctly. The change in direction must be the larger and speedier, the closer to each other the vessels are both in distance and in time.

Starting to overtake by altering the direction by 3° to the right was inadequate in the circumstances, especially when keeping look-out while overtaking was neglected. In a close-quarters situation, an attempt should be made to express one's intentions primarily by means of a clear turn. The effects of this can be accentuated by means of a sound signal following the rules of the road at sea, although in case of pleasure crafts, it is uncertain if the other party can interpret the signal correctly. An absolute prerequisite for using the autopilot is monitoring and verifying any changes of direction made. The autopilot does not steer the boat, it only maintains the course set by the operator.

Overtaking within close quarters was not necessary for any navigational reason, as there was plenty of clear and deep water around the whole area. Even if the manoeuvre had been successful, NINAMARIA II would have passed far to close to ILONA. The passage at a close range of a large boat always results in a dangerous situation, not only as regards a risk of collision but also because the waves created by boats may result in hazardous rocking or changes of direction. Passing near by at great speed shows that the Master of the boat was immature and lacking in seamanship.

2.13 The autopilot

At the time of the accident, NINAMARIA II was being steered by the autopilot. An instant before the collision, the Master used the autopilot to perform the 3-degree change in direction that he had determined necessary. The autopilot worked as intended, and its operation was faultless. It kept the vessel in the direction set by the Master.

The use of an autopilot in steering a boat is normal and in line with good seamanship. The autopilot frees the operator from holding the wheel to perform other navigation tasks, such as keeping look-out, navigation and observing the progress of the boat. Considering that the Master of NINAMARIA II was the only person performing navigation tasks on the boat, the use of autopilot in maintaining direction was quite justified.

The autopilot is not responsible for manoeuvring the boat. The autopilot or its use cannot be considered the cause of the accident. The Master always assumes responsibility for the progress of the boat. In this accident, the Master used the autopilot to perform a give-way manoeuvre that was quite inadequate, and then neglected his duty to monitor the alteration in direction implemented by the autopilot and its adequacy to prevent a collision. A technical device cannot be blamed for being used to implement erroneous decisions.

2.14 Communication links

According to an international definition[1] an emergency is a situation where a person, ship or other craft clearly is in a serious or immediate danger and in need of immediate assistance. In that case, an emergency call must be made. A call made using a mobile phone is only passed between the parties to the conversation. An unaddressed emergency call sent by the VHF radio is public and intended for anyone who picks it up.

The problems in communication were not due to lack of equipment, as NINAMARIA II had VHF radio equipment. Throughout the chain of events, however, the Master did not use the radio. In NINAMARIA II's communications, the mobile phones of the Master and passengers were used. No emergency call was placed on NINAMARIA II, nor was the incident reported to the authorities. On the other hand, persons on the boat apparently placed private calls to such persons as the owners' representative, who arrived at the scene as explained elsewhere. He did not report the collision to the authorities, either.

[1] Government proposal for the Act on Maritime Rescue and its justifications (HE 71/2001 vp) and Maritime rescue instructions 2003

The crew of ILONA had been immersed without rescue equipment, and in the early phase of the situation, the people on NINAMARIA II could not possibly know how many victims there actually were or what type of assistance was needed. An emergency message on the VHF radio would have been passed on to the Maritime Rescue Co-ordination Centre directly without the Emergency Response Centre being used as a link. Additionally, not only the Maritime Rescue Centre but authorities and other vessels, who were within range and could have immediately provided assistance, would have heard the message. Not using the VHF was an error, and it could have contributed to making the consequences of the accident worse.

Two kinds of conclusions can be drawn from NINAMARIA II's actions as regards not using the VHF and failing to report the emergency: either NINAMARIA II tried to avoid reporting the incident and calling for assistance, or those onboard the vessel did not grasp the situation, and failed to understand how serious the incident was and what duties it entailed to them. Avoiding the use of the VHF radio – and the failure to report the emergency in general – obviously is a factor that risks the safety of victims. If other yachters had not happened to arrive at the scene, we may only guess how long the crew of ILONA might have had to survive on their own in the sea.

2.15 Emergency call to 112

The emergency call was made to the Emergency Response Centre, from where the call was connected to the Maritime Rescue Co-ordination Centre. The duration of the emergency call with the Emergency Response Centre and the Maritime Rescue Co-ordination Centre was 7 minutes and 19 seconds in total. In the opinion of the person who placed the call, this time was far too long for receiving an emergency call, despite the fact that on this occasion, the persons in distress had already been rescued.

The investigators' attention was drawn to the fact that when the emergency number 112 was called, there was no operator with navigational competence available to receive the emergency call. The recording shows that the Emergency Response Centre operator and the caller were confused about the location, and the operator could not guide the caller in clearly reporting the scene of the incident. It was obvious that the operator was not sufficiently familiar with the archipelago or the methods for indicating positions that are used at sea. Only after the call was put through to the Maritime Rescue Co-ordination Centre was the matter finally resolved.

When placing a call from a boat that is sinking or on fire, for example, the time available is extremely short. This time should not be wasted because of lack of skill. On this occasion, the situation luckily was already over when the call was placed.

2.16 Rescue operation

When persons have fallen into water, the first step should be to announce the incident loudly and to throw rescue equipment to those in the water, such as a life buoy. After this, the situation should be immediately analysed, the vessel prepared for lifting the persons up and persons on the vessel ordered to perform various tasks. From the start, the personnel on NINAMARIA II did not act in a determined or directed manner. Valuable time was thus wasted. For example, a rope was thrown to a person in the water only after the second victim had specifically asked for this to be done.

It appears that the eye witnesses and other boats arriving at the scene did not take part in rescuing the persons in the water, either. The situation was new and shocking for them, and in fear of causing additional damage, they did not dare approach the persons in the sea to assist them. However, the emergency call was made and liaisoning with the Coast Guard ensured solely by them.

The Coast Guard units arriving at the scene found that the situation was over, and their action was not required to rescue people or to prevent an immediate threat. The Coast Guard focused on towing ILONA to Kasnäs.

It was not found necessary to alert rescue assistance to Kasnäs, as the victims' injuries were not assessed as significant. What was ignored in this connection, however, was the mental state of the victims, and their practical needs for travel and accommodation.

When the mast was sunk, evidence that would have been significant in the investigation about the course of the collision was lost. The mast also had residual value in form of sails and equipment.

2.17 Analysis of the collision marks

In the stem of NINAMARIA II, there are clear collision marks in the (blue) area of bottom paint. Above the waterline in the stem, there is a black mark, which apparently was made by ILONA's black rub nail. As the boat left the country, any underwater marks of the collision were not documented.

The top part of ILONA's transom has impact marks containing blue paint transferred from NINAMARIA II. The first contact was high up close to ILONA's centreline. From here, NINAMARIA II continued on her course on top of ILONA, as an estimate until NINAMARIA II's stem reached the top part of ILONA's transom more or less level with the waterline. Based on the scuff marks in the paint, the colliding motion progressed directly forwards and up.

ILONA's stern ladder was also hit at some stage of the impact. The right side of the ladder was bent, and the left bottom stay was pushed in. The mark suggests a situation where the impact was directed diagonally from left to right.

For some reason, ILONA turned to the right in front of NINAMARIA II, which is indicated by the signs of damage shifting to the right, and in addition to paint marks, also by the way ILONA's stern railing was knocked down. At this stage, ILONA's after stay became detached.

The following contact marks are on the right (SB) side of ILONA, and they come to an end after ILONA's open deck area. As ILONA's boom was on the right, it was hit by NINAMARIA II's bow. In addition to the boom, the mast side stays (shrouds) became detached, and the mast was hit by a strong impact, as a result of which it was broken in two places.

After the initial contact, the impact course continued diagonally towards ILONA's stern, so that the boats mainly glided on top of and beside each other, and NINAMARIA II's bow did not penetrate very far inside ILONA. A significant part of the impact energy was spent as NINAMARIA II rose up, ILONA was pressed down and there was friction between the boats. Not all of NINAMARIA II's energy was spent on the impact, and the boat continued forwards after the collision.

If NINAMARIA II had collided centrally without ILONA turning aside out of its way, the entire impact energy would have been spent on fracturing of material. ILONA would have sustained such major damage that fast sinking would have resulted from it.

2.18 Safety management plans

It appears that the safety culture of NINAMARIA II's shipping company did not include anticipatory risk prevention or planning of activities in case of accidents. It seems obvious that NINAMARIA II's shipping company did not have a safety management plan in compliance with the ISM code, or any other safety plan. A safety management plan would have given the crew in each case clear and practiced operating instructions, which would have ensured a quick launching of the rescue operation and logical and efficient action. In the early phase of the incident, the whole personnel of NINAMARIA II was unable to act, and it took a long time before the vessel even reached the other boat involved in the accident. They also did not initiate even the most basic rescue operation, such as throwing life buoys to the persons in the sea or making an emergency call on the VHF radio.

NINAMARIA II was not at all prepared for making an emergency call. Under international conventions, in case of an accident the distress message should be radioed to the nearest Maritime Rescue Co-ordination Centre, and all possible rescue actions should be undertaken, however without risking the safety of the vessel. This universal requirement did not occur to the personnel on NINAMARIA II, and they only communicated about the incident to their own interest groups. The emergency call was placed by outsiders who happened to arrive at the scene on their yacht and called the Emergency Response Centre on a mobile phone.

No direct communication link was established with NINAMARIA II even later. Later contacts were passed on by the Finnish family members of the vessel owners.

2.19 Psychological aftercare - debriefing

Being in a genuine danger of loosing your life, and consequent loss of the boat and interruption of your holiday in a strange location, is a situation most people would find difficult. Despite the fact that they are not injured, it is important to ensure that those involved in an accident receive psychological and material care after the incident.

In this incident, the rescued crew members were taken to Kasnäs. As the Coast Guard's mission is completed once lives are no longer at risk, the man and woman rescued from ILONA were deposited without particular social care on the archipelago road quayside, where they were left to arrange any further steps themselves. In this situation, too, it would have been important to look after the victims after the immediate danger had passed to help them to assume a calmer attitude towards the situation and return to normal life.

2.20 NINAMARIA II's departure from Finland

The authorities did not prevent NINAMARIA II from leaving the country. The boat left the country rather soon after the incident.

As a consequence of the boat and its Master having left the country, the investigators missed out on valuable information about cockpit arrangements on the boat, visibility from the cockpit, usability of the controls and many other things. No accurate modelling of the chain of events during the impact could be produced, as the other party was not available.

The actual boat was the only significant property the ship managers had in Finland. As it left the country, the other party's possibilities of obtaining compensation for damage sustained was seriously undermined, and they had to rely on promises given by a representative of the ship managers concerning insurance.

If the authorities had taken possession of NINAMARIA II until the investigation and compensation process were well under way, the accident investigation would have uncovered more information about the incident and its causes. It should have been understood in an early phase of this case that the guilty party was rather obvious, and the authorities should have protected the rights of ILONA's owners by this measure.

2.21 Assessment of risks associated with the accident

This accident fortunately only resulted in material losses. The situation was dangerous, however, and could have lead into considerably greater damage and even fatalities.

The amount of damage caused by a collision depends on such factors as the boat's kinetic energy. The kinetic energy of NINAMARIA II was in the same range as that of a fully loaded lorry driving at a city speed. It was lucky that in this case, the collision speed was lower than the travelling speed, and the impact took place diagonally, ensuring that only part of the kinetic energy was released on impact.

ILONA's hull was left on the surface after the collision. If NINAMARIA II had hit ILONA's stern at a slightly different angle, ILONA could have been broken to pieces and sunk rapidly.

The crew jumping overboard at the right moment succeeded in this particular accident. Their possibilities of being crushed under NINAMARIA II were great, however, and their rescue from cold water was uncertain. Based on this case, jumping overboard cannot be recommended as a universal instruction in similar situations. The importance of wearing boating vests in the open deck area of a sailing yacht should not be underestimated, either.

If the rescue of the persons in the sea had been delayed further, it might have resulted in drowning, especially as regards the man. His rescue from the water took unacceptably long. If the persons in the water had lost their functional ability, it is unlikely that they would have been rescued on time, considering the poor effort on part of NINAMARIA II in the early phase of the rescue.

If the yachters had remained in the open area of their yacht, there would have been a very high likelihood of their being crushed under NINAMARIA II's bow, or thrown into the water. There might also have been passengers inside ILONA's cabin. In the first stage, they would have escaped with contusions. If ILONA had sunken suddenly, persons inside the cabin would have been very likely to sink with the yacht with fatal consequences.

Personal injuries might also have been suffered on NINAMARIA II. A person who was standing up at the time of the impact might have been injured, and especially persons on the open decks might have fallen in. In this accident, however, the persons inside NINAMARIA II, or those sitting in the open cockpit, were safe.

3 CONCLUSIONS

NINAMARIA II was being operated carelessly and without adequate regard for other waterborne traffic. The Master did not take his task seriously enough, and in practice he fully neglected keeping look-out. The general observation distance in this navigational situation was far too short to enable NINAMARIA II to select its path as required by other traffic. The crew of the boat formed no comprehensive overall perception of vessels that were visible, and giving way was done at the last minute as the other party right in front of the boat was noticed, and even in that situation, the boat did not give way adequately or monitor the performance of the manoeuvre.

Contributing factors in the accident were the fact that the Master focused his attention to talking to the cook, turning his face sideways or possibly leaving the controls. Visibility from the outdoor cockpit would have been clearly better than from the indoor one, but the Master did not use this possibility when navigating in the archipelago.

NINAMARIA II was being operated selfishly, only considering the boat's own course, and not taking the movements of other craft into account before a close-quarters situation was inevitable. The autopilot was used to stay on course, and the Master responded to the need to give way to ILONA far too late. The water area was extensive, and there was no need for either vessel to travel in the centre of it. There was no navigational reason to prevent ILONA from travelling on the right side of the fairway area, and NINAMARIA II to overtake it going a good distance to the left. This would have been the procedure dictated by good seamanship.

NINAMARIA II lacked a practiced operating model of actions in case of an accident, or it was not applied in this incident. The rescue equipment were not taken into use, and not even life buoys were thrown to the persons in the sea. Clear direction was lacking in the rescue operation, and it took unreasonably long before the vessel took clear action to rescue the persons in the sea. Placing an emergency call was neglected, and mobile phones were used for other communication. A rubber dinghy placed on the stern deck significantly obstructed the use of the ladder that could be lowered into the water. This occurred despite the fact that NINAMARIA II's Master had professional qualifications as a seafarer, and a representative of the ship managers' responsible management was on board.

NINAMARIA II's Master lacked knowledge of navigation in the archipelago and the Finnish boating culture. He was not able to manoeuvre in the archipelago, and apparently did not understand the impacts of fairways, shallows and numerous other boats on planning the boat's course.

In terms of commercial use, NINAMARIA II was undermanned. In archipelago traffic, the use of a look-out would have been necessary, especially as the Master was uncertain about navigating in the archipelago. In addition to the Master, there were other persons on the vessel, but they were not used as look-outs, or they were not up to their task.

The incident reveals a neglect of safety culture and planning of safe operating methods. The ship managers' safety culture was deficient, and they failed to intervene, or had not enough knowledge to intervene, in the risk factors entailed by the operating method followed on the boat. Whether the boat was used commercially or as a pleasure craft, the duty of the owner would have been to ensure that the boat is operating following good seamanship and that the necessary safety structures are in place.

As NINAMARIA II was a registered commercial vessel, the ship managers should have ensured by their supervision that the procedures on the boat were in line with the safety culture, and provided the prerequisites for this. The fact that NINAMARIA II possibly operated as the ship managers' pleasure craft without an intention of making a profit at the time of the incident does not release the Master or the ship managers from responsibility for vessel safety, and it certainly does not entitle them to operate a vessel as carelessly as they did on the voyage ending with the accident.

The Finnish ship managers of NINAMARIA II must have been aware of the deficiencies as regards the Master's practical skills in operating in the archipelago. Even before operating in Finland, the ship managers should have anticipated the fact that the Master might not be a good navigator in the archipelago, especially on a boat as large as this. Regardless of this, the Master was in practice allowed to operate the boat single-handedly. There was no second crew member to act as a deck hand to assist the Master in compliance with the flag state authority's requirements.

Attempt to give way

The alteration in direction made to give way was dangerously small, and the development of the situation was not monitored after it. The vessel was left to travel in the direction set on the autopilot in a close-quarters situation without supervision. An absolute prerequisite for using an autopilot is monitoring and verifying any changes of direction made. The autopilot does not steer the boat – it only maintains the direction set by the Master, wherever that direction takes it.

Even if it had been successful, the 3-degree change performed by the Master to give way would have taken the boat far too close to the yacht to be overtaken. This action indicates lack of seamanship and immaturity in operating a large motor boat in the Finnish archipelago.

Rules on giving way

Under the rules, the duty to give way was NINAMARIA II's alone. ILONA primarily had the duty to keep its course and speed steady until the situation was over. The rules of the road at sea concerning giving way are adequate and up to date enough to make it possible to avoid accidents of this type.

Both the vessels were under an obligation to keep a lookout and to observe the situation. The vessels were in sight of each other at least 15 minutes prior to the collision.

Onboard ILONA the oncoming NINAMARIA II was noticed slightly before the situation became serious. The development of the situation was followed and the crew was able to assess the point where ramming became presumable. Because of this the crew was able to jump overboard just in time. This turned out to be the right act in this case.

Onboard the NINAMARIA II the proactive lookout was fully neglected. In spite of the fact that the ILONA was in sight over 15 minutes prior to the collision, the sailboat was not observed and the collision risk was not evaluated, as it should have been. When the ILONA was finally observed, this observation was not taken seriously enough. The passing manoeuvre was erroneously small and after the small course alteration, the passing situation was no longer monitored.

If the crew on NINAMARIA II had followed the lookout obligations stipulated in the Rule of the Road, the ILONA would have been noticed from an adequate distance. The situation would have been evaluated in good time so that the collision would have been avoided.

The lookout rules in maritime traffic are adequate and up to date to make it possible to avoid accidents of this type

3.1 Cause of the accident

There were no technical causes for the accident.

The immediate causes of the collision were NINAMARIA II's

- failure to keep look-out at the crucial moment as the vessels already were in a close-quarters situation,
- misjudgement in performing the give-way manoeuvre and
- failure to supervise the performance of the give-way manoeuvre.

Shortcomings in the safety culture of NINAMARIA II's ship managers was a contributing factor to the accident. These had an impact on the way the vessel was operated before the accident and the actions after it. If the crew of NINAMARIA II had even complied with simple principles of good seamanship, not to mention any actual safety management plan, efficient action to rescue the victims would have started immediately, and the persons in the water would not have been left swimming around without rescue equipment and fending for themselves. Placing an emergency call should also have been one of the first measures after the collision. If the victims had not been able to rescue themselves, the consequences of this accident would have been fatal.

3.2 Other emerging issues

Assistance to those involved in the accident after the incident

Under the valid regulations and procedures, the authorities do not assume sufficient responsibility for the after-care of accident victims. As no-one was in need of clinical assistance, the crew of ILONA, who had lost their boat, was left in Kasnäs more or less

on their own devices. The victims were looked after by the voluntary maritime rescue actors, even though this type of activities are not actually part of their duties.

An arrangement should be put in place to ensure that in a case like this, the victims receive adequate support to cope with the situation. Even if the after-care cannot be part of the duties of parties responsible for maritime rescue, in similar accidents parties whose job descriptions do include this type of care should be informed.

The investigation revealed that the processing of compensation for financial losses has been delayed because the other party to the accident was a foreign vessel that left the country soon after the incident. This had an impact on such as securing legal protection, as the other party did not have property in the country.

Emergency calls in marine accidents

Delays are always associated with an emergency call placed with a mobile phone. These are due to the fact that the call is connected to a regional Emergency Response Centre, which in many cases does not routinely process maritime matters. The centralisation of the Emergency Response Centres had made the situation worse, as operators have less local knowledge. The capacities of Emergency Response Centre operators to receive an emergency call from the sea are also limited, which was demonstrated by this accident.

The limited capacity of mobile phones to create communication links has also been noted in other investigations, such as D11/2009M and D18/2009M. A particular investigation should be conducted to look at the functioning of emergency calls from sea areas to establish if emergency calls from the sea should always be automatically relayed to the MRCC.

The areas covered by the Emergency Response Centres are about to become even wider. Due to this, the situation may become increasingly difficult in the future, and more demanding for the caller.

Operation of a foreign vessel in Finland

The entitlement of a foreign shipping company to operate in Finland is not associated with an adequate requirement for the company to familiarise itself with the special conditions of archipelago traffic. Operating a vessel the size of NINAMARIA II in the archipelago requires not only international competency in seamanship but also local knowledge.

In the investigators' opinion, charter and rental boat companies operating within the EU area should comply with the safety instructions and norms adopted for the area. It cannot be acceptable that safety issues can be ignored just because the enterprising activities are located outside of the area. The investigation could not establish on what basis NINAMARIA II had avoided supervision by the authorities as to compliance with safety requirements applicable to a passenger vessel.

NINAMARIA II's departure from the country

After the accident, NINAMARIA II was able to leave the country without being stopped by regulations or the authorities. This obstructed the investigation of the accident. The relevant acts and decrees, and the orders and instructions concerning their enforcement, may contain deficiencies that make it possible for a vessel having been party to an accident to leave the country without receiving permission from the authorities. In similar cases, the needs of accident investigation and any criminal investigation should be secured before the vessel is allowed to leave the country.

Boat operator's card

The Master of NINAMARIA II has a certificate of competency that entitles him to operate a motor boat much larger than NINAMARIA II in commercial traffic. Consequently, his formal qualifications clearly exceeded the level that could be required for any operator card for pleasure craft. This accident does not justify the introduction of an obligatory boat operator's card on pleasure craft. The accident was not caused by a lack of formal competency.

Ability to steer a sailing yacht

The incident demonstrates that it is difficult for a sailing yacht, and especially one sailing with the wind, to change its course. The change of direction may require detaching the sail ropes, in which case the yacht also looses speed and is no longer manoeuvrable. Keeping the engine ready to start would improve a sailing yacht's possibilities of giving way in situations similar to this accident. Starting the engine would not in this situation have affected the obligation to give way between the vessels.

3.3 Estimate of the likelihood of this type of an accident reoccurring

The fact that this accident involved a foreign craft does not exclude the possibility of a similar accident also occurring to Finnish boats. Large and heavy motor boats have become more common in Finnish waters. Even though the majority of their operators are competent, in the investigators' opinion there also are those whose attitude towards their responsible task is erroneous in a similar manner and experience as inadequate as that of NINAMARIA II's Master. We cannot conclude based on this accident that the situation only occurred because one of the parties was foreign. Experience and skills must be obtained through long-term yachting experience, not just by becoming a boat owner.

This accident was not due to the fact that the boat having collided into the sailing yacht was large in size. Similar errors as to keeping look-out and giving way could be made in a small boat, and the consequences of an impact would be at least as disastrous.

4 RECOMMENDATIONS

As a consequence of this incident, the Accident Investigation Board recommends that:

1) *An authorisation and duty to ensure good safety management on passenger vessels and charter boats in domestic traffic and verifying the manner in which they are recorded in the ship managers' vessel safety and rescue plans be given to the Finnish Transport Safety Agency and to the Finnish Border Guard.*

2) *In information disseminated to the yachting and shipping sector, the Finnish Transport Safety Agency focus on the importance of keeping look-out and the correct method and distance of giving way and also emphasize the fact that in marine accidents the emergency call should be made directly to the Maritime Rescue Centre's Maritime SAR Alarm Number 0204 1000 instead of the emergency number 112.*

3) *The Finnish Boating Association, the Finnish Sailing Association and the Finnish Navigation Association create an instruction and a training programme to create a safety system for pleasure craft and to practice its implementation, and that the existence of such a system be a requirement in boat inspections from a suitable size class up.*

4) *The authorities responsible for maritime rescue would ensure that the victims have the practical means of coping after an accident, even if no immediate danger exists.*

Helsinki 7 January, 2011

Klaus Salkola Pertti Siivonen

SOURCES

The following sources are on file in the Accident Investigation Board:

1. Recording of the emergency call
2. Recording of the processing of the Maritime Declaration
3. Coast Guard event log, no 959
4. Notes of an interview with the crew of ILONA
5. Notes of interviews with eye witnesses
6. Pre-trial investigation documents
7. Photographs of damage sustained by the boats