



## Investigation report

C 1/2005 M

# **M/S PAULINE RUSS, grounding in Hanko Port 20.01.2005**

Translation of the original Finnish report

This investigation report has been written to improve safety and prevent new accidents. The report does not address the possible responsibility of liability caused by the accident. The investigation report should not be used for purposes other than the improvement of safety.



## SUMMARY

The Ro-ro passenger vessel PAULINE RUSS was on her way from Tillbury (GB) to Hanko on 20.01.2005.

The vessel took a pilot near Gustavsvärn island at 01:09 on 20 January 2005. The VTS notified the pilot that wind direction was 185° and wind speed 11-15 m/s. The ship passed buoy Hanko No. 8 at about 01:18 and arrived in the turning area at 01:24.

The vessel was turned through the right in the water area between the breakwater and the Meijerfelt buoy. The pilot also suggested the possibility of turning the vessel in port inside the breakwater, because there was plenty of room as the port was empty, but the master decided to use the other turning area. The pilot and the master did not discuss the use of tugboats.

After the turn, the vessel started reversing at a speed of about 2.5 knots towards pier No 1 while the propeller pitch was 25%. The stern steering propeller was full left and the vessel was steered by means of the bow steering propeller.

The vessel passed the breakwater at 01:30, at which point the pilot notified the master that the vessel was drifting north. Also the master had noticed that the vessel was drifting towards the red buoys north of the safe water area.

The master was steering the vessel with the control equipment in the left bridge wing and the pilot was on the lookout in the right bridge wing. There was no helmsman on the bridge. As the vessel was at the first red buoy, the pilot suggested that she had to go back out or increase speed. The master did not react to the suggestion and continued reversing towards the pier.

As the stern of the vessel was near the pier at 01:35, the bow thruster of the vessel was not able to lift the bow towards the pier with full power against the wind. The master decided to steer out of port. First he turned the rudder left and changed the propeller pitch to 60 % ahead to make the bow turn left. When he noticed that this movement resulted in the stern turning north towards the first red buoy from the perspective of the port, he turned the wheel right, but this did not prevent the stern of the vessel from drifting on top of the buoy and slightly touching the bottom.

A reason contributing to the accident was a lack of bridge co-operation, which resulted in a deficient estimate of the wind conditions on the manoeuvrability of the vessel.



## THE ABBREVIATIONS USED

ECDIS	Electronic Chart Display and Information System
IMO	International Maritime Organization
ISM	International Safety Management (Code)
kW	Kilowatt
NFU	Non follow up
SMS	Safety Management System
VDR	Voyage Data Recorder
VHF	Very high frequency
VTS	Vessel Traffic Service



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## FOREWORD

The Accident Investigation Board was notified of the grounding of the M/S PAULINE RUSS on 20.1.2005. The Accident Investigation Board was in touch with the maritime authority and received immediate information about the accident.

On 27 January 2005 the Accident Investigation Board appointed an Investigation Commission to investigate the accident. Captain Juha **Sjölund** was appointed Investigator in Charge per consent and Captain Karl **Loveson** was appointed member and Captain Kari **Larjo** was appointed expert.

The Finnish investigation authorities have acted as the party in charge of the investigation in accordance with Resolution A.849(20) of the International Maritime Organisation (IMO).

The investigators heard the master of the vessel on 20 January 2005 and familiarised themselves with the vessel. The investigators heard the pilot at Hanko Pilot Station on 25 January 2005. The investigators were present when the master of the vessel gave his maritime declaration in Hanko on 4 March 2005.

On 20 January 2005, the investigators asked the master for the ECDIS recording and the instructions of the company describing work on the bridge on the basis of the Accident Investigation Act of 3 May 1985/373 and IMO Resolution A.849(20). According to the master, these would have been available only at the consent of the company. The company did not give its consent, and so the material was not made available. In addition, on 4 May 2005, the company notified through its agent in Finland that the ECDIS recording no longer existed.

The investigation of the accident is based on the maritime declaration of the master with appendices and on hearing the master and the pilot.

The final draft of investigation report was sent to the master and the pilot for comments.





## 1 EVENTS AND INVESTIGATIONS

### 1.1 The vessel



Figure 1. The M/S Pauline Russ

#### 1.1.1 General information

Name of the vessel	The M/S Pauline Russ
Type	Ro-ro cargo vessel
Nationality	Antigua Barbuda
Company	Ernst Russ GmbH.KG
Owner	Ernst Russ GmbH.KG
Home port	Hamburg
Call sign	V2OF
IMO No.	9198989
Year and place of construction	1999 Hamburg
Classification society	Germanischer Lloyd
Class	RO/RO Forest and Trailer Carrier ice-classed GL E 4
Weight	10488
Net weight	3146
DWT	7096
Length, max	153.45 m
Length, B.P.P.	142.80 m
Breadth, frame	20.85 m
Breadth, with stabilizers	25.75 m
Draught	7.00 m max





### Steering thrusters

Bow	800 kW
Stern	500 kW
Engine power	1 x 15600 kW
Speed	21 knots

### 1.1.2 Manning

The vessel has a Polish crew of 13. The deck crew consists of the master and two mates. The engine crew consists of the chief engineer and the engineer.

#### **Those on the bridge at the time of the event:**

##### **The master**

The master was born in 1954 and he went to sea in 1978. He obtained the qualifications of captain in 1995. He has been serving as master since 1997. He has been serving onboard vessels of this type since 1999 and on the Hanko–Lübeck line for four years. He first came onboard the PAULINE RUSS as master on 8 September 1999.

##### **The pilot**

The pilot was born in 1963 and he went to sea in 1984. He obtained the qualifications of captain in 1992. After that he served as chief mate on passenger and cruise vessels with the rank of chief mate and staff captain. Before he became a pilot, he served as master of a vessel of the type of the PAULINE RUSS for four years. He started as a student pilot in Hanko in May 2003 and as a pilot in November 2003.

### 1.1.3 The bridge and its equipment

The general layout of bridge complies with the standard of the vessel built in the Sietas Yard. The investigators did not have a list of equipment available to them.

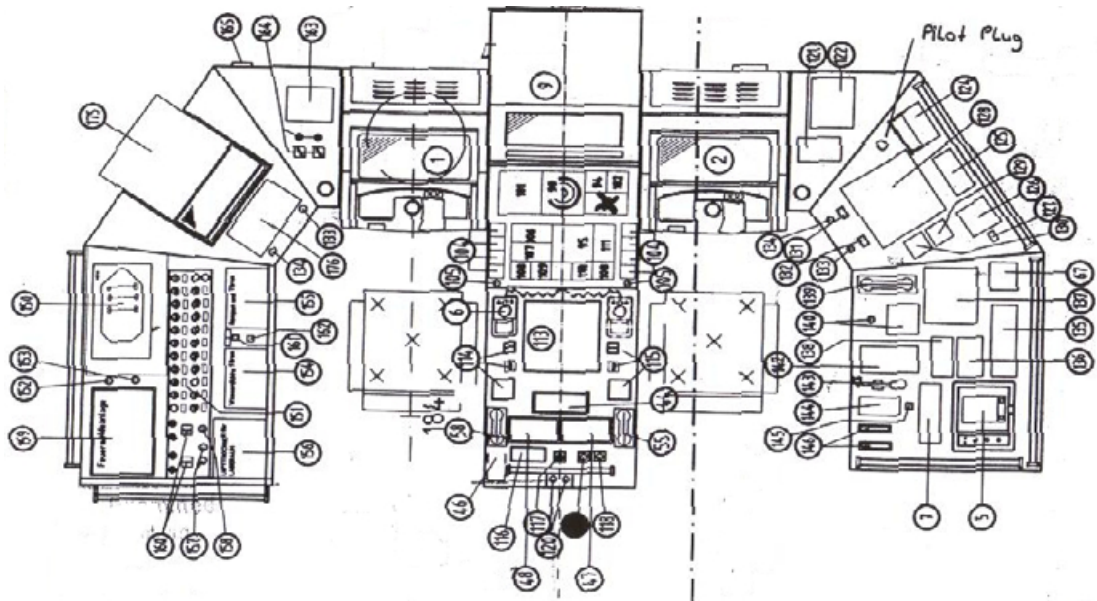


Figure 2. Overall layout of the centre console.



Figure 3. The console in the portside wing of the bridge.

The equipment on the starboard bridge wing from left (Figure 3):

1. Control of the NFU rudder
2. Control of steering propellers



3. Control of the variable pitch propeller
4. The VHF radio telephone
5. Display of the surveillance camera

The most important indicators at the top of the console are the rudder angle indicator, wind gauge, ROT indicator of the main engine and the slave display of the compass.

#### **1.1.4 Machinery**

The vessel has one 15,600 kW main engine. The propeller is a four-blade variable-pitch propeller. When reversing, the rudder pulls the stern of the vessel portside. The turning angle of the Becker rudder of the vessel is 65°. The power of the bow thruster is 800 kW and the power of the stern thruster is 500 kW. The main engine is run at standard revolutions and the axial generator feeds the bow and stern steering propellers.

#### **1.1.5 Cargo**

The vessel had a total cargo of 393.9 tons. Four trailers, five 40' containers, two 20' containers, one empty "mafi" and 219 cars. She had four pallets of IMO Class 3 cargo. The DWT was 2,988 tons. There were no passengers.

#### **1.2 The accident event**

The account of the accident is based on the maritime declaration record with appendices as well as on the hearing of the master and the pilot.

##### **1.2.1 The accident voyage and its preparation**

The PAULINE RUSS on way from Tillbury (GB) to Hanko. Her draft at bow was 5.4 m and at stern, 6.1m. The vessel passed buoy Hanko No. 1 at 15:00 on 20 January 2005. The vessel took a pilot at Gustavsvärn at 01:09. The VTS notified the pilot that the wind direction was 185° and the wind speed was 11-15 m/s. The officer on watch left the bridge before the turning area to go to the stern. The ship passed buoy Hanko No. 8 at about 01:18 and arrived in the turning area at 01:24.

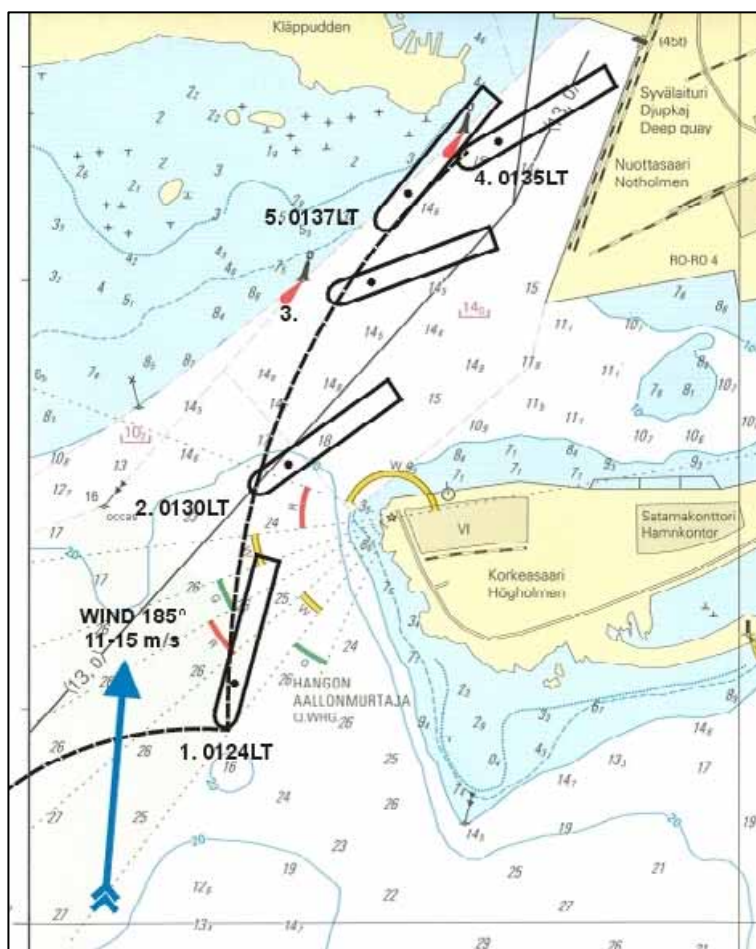


Figure 4. The idea of the investigators on the path of the vessel.

The pilot and the master did not discuss the use of tugboats. Master told that he has not any exact wind limit for approaching to harbour. He has never stayed outside of the Hanko harbour because of weather conditions. Using tugs depends of wind speed and direction on each approach. Ships owner has not determined any wind limit to the approach.

According to the pilot he suggested that the vessel be turned either in the between Meijerfelt buoy or in port inside the breakwater, because there was plenty of room there as the port was empty. The master chose the area between Meijerfelt buoy and breakwater and he turned the vessel clockwise in that area.

After the turn, the vessel started reversing towards pier No 1 while the propeller pitch was 25%. The stern steering propeller was full left and the vessel was steered by means of the bow steering propeller. According to the pilot, the speed did not exceed 2.5 knots at any time during the reversing. The vessel passed the breakwater at 01:30, at which point the pilot notified the master that the vessel was drifting north. Also the master had noticed that the vessel was drifting towards the red buoys north of the safe water area.

The master was manoeuvring the vessel in the port wing of the bridge. The pilot was on lookout in the starboard wing of the bridge. There was no helmsman on the bridge. According to the pilot, as the vessel was at the breakwater he suggested that she had to go back out or increase speed. At first red buoy the pilot suggested that if the vessel cannot be brought more towards the wind she had to go back out. The master did not react to the suggestion and continued reversing towards the pier. As the stern of the vessel was near the pier at 01:35, the bow thruster of the vessel was not able to lift the bow towards the pier with full power against the wind. The master decided to steer out of port. First he turned the rudder left and changed the pitch of the propeller to 60 % ahead to make the bow turn left. When he noticed that this command made the stern turn north towards the first red buoy from the perspective of the port, the master turned the wheel starboard. This did not prevent the stern of the vessel from drifting on top of the buoy and from slightly touching the bottom.

### 1.2.2 The site

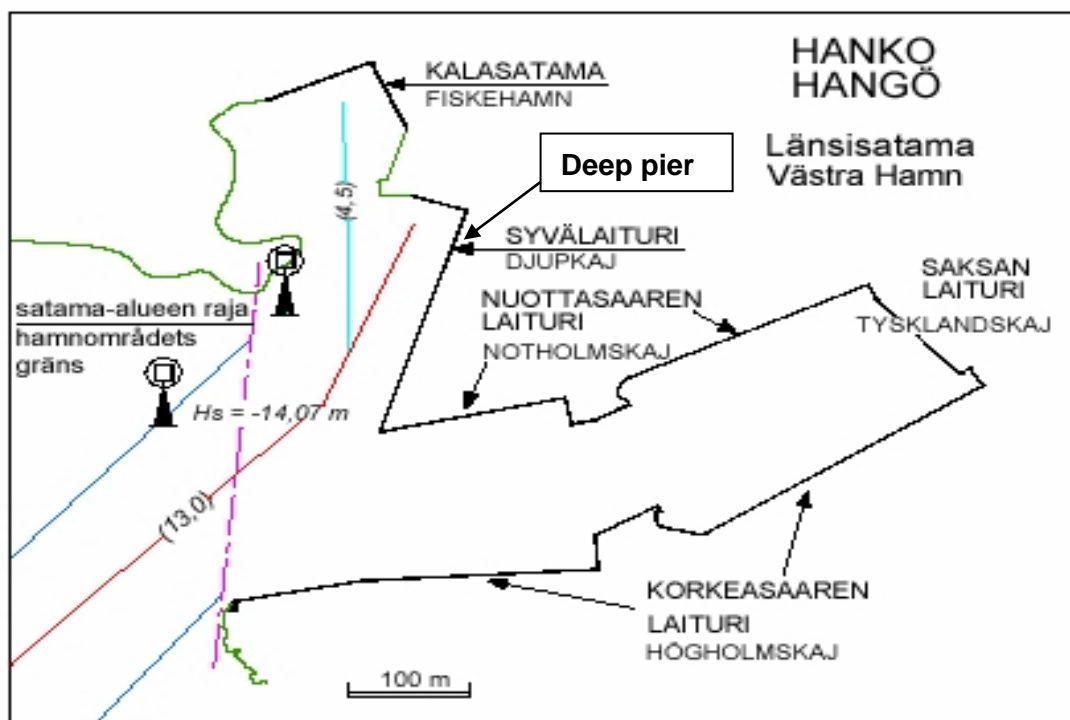


Figure 5. The vessel was reversing to the so called “deep pier”. FMA fairway chart

### 1.2.3 Weather conditions

The master noted in the interview that the wind suddenly shifted to 250° and the wind speed was 11–15 m/s. This estimate coincided with the information registered at Tulliniemi.

Table 1. Hanko Tulliniemi automatic registration on 20 January 2005 at 01:00 Finnish time. The accident took place at 01:09.





Legend	wind m/s
Average hourly wind speed	11.7
Minimum average 10-minute wind speed during the hour	11.0
Maximum average 10-minute wind speed during the hour	12.8
Maximum wind gust in the hour	14.5
Average hourly wind direction	184°

#### 1.2.4 Damage to the vessel

The rudder of the vessel was damaged so that the flap of the Becker rudder could not be used after the accident. The flap had to be supported by three steel beams on both sides of the rudder so that it became a conventional rudder. The tips of the propeller flaps were damaged at a length of 130 cm. Uniform sections with a length of 150 cm and a maximum height of 23 cm were cut off from the tips of the flaps. The repair work could be done by divers in Hanko. The vessel made a test run off Hanko and the classification society approved the temporary repairs and granted the vessel a three-month special permit for traffic provided that the rudder supports be examined at the end of February 2005. The vessel returned to traffic on 24 January 2005.

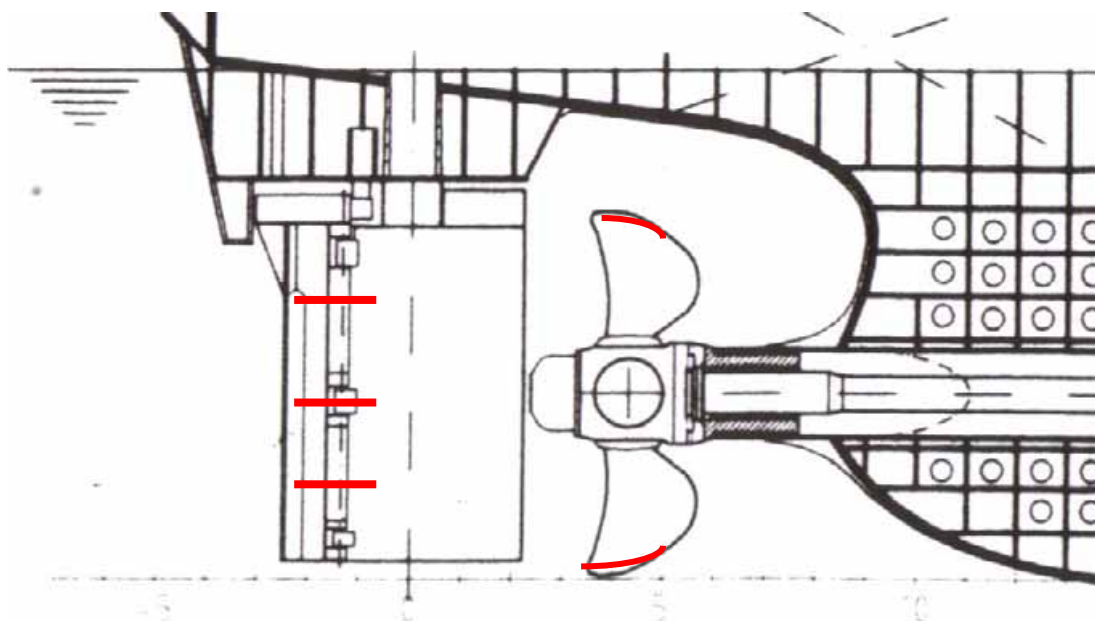


Figure 6. The damage to the propeller and rudder with the temporary repairs marked in red.

#### 1.2.5 Other damage

The buoy which the vessel hit sank. Three days were spent looking for the buoy in the port area, but without result. The search ensured that the buoy would not cause damage to other vessels manoeuvring in the port. A spar buoy was attached to the weight and cable, which were left at the place of the buoy. The total costs to Hanko Port were about EUR 5,500.

### **1.2.6 Registration equipment**

The vessel did not have a Voyage Data Recorder (VDR). The vessel has an electronic chart system storing the path of the vessel with regard to the bottom, bow direction and speed with regard to the bottom. After the bottom touch, the master and the pilot had together looked at the movement data registered by the electronic chart system.<sup>1</sup> Despite their request, this information was not made available to the investigators.

### **1.2.7 The operation of the supervision and VTS systems**

The supervision area of the Helsinki VTS is divided into three sectors and Hanko port belongs to sector 3 of the Helsinki VTS. The VTS did not have a reason to react to the movements of the PAULINE RUSS before its grounding, because the vessel was in scheduled traffic and it was steered by its permanent master and an experienced pilot. The vessel did not request manoeuvring assistance.

### **1.2.8 Measures after the event**

At 01:45 the pilot notified the VTS that the northernmost red buoy at the deep pier had ended up under the vessel and that the vessel had engine problems, and that therefore the PAULINE RUSS would move to anchor at Gustavsvärn. The vessel dropped anchor at 02:12 and the main engine was stopped at 02:20. The crew of the vessel examined the possible damage. No leaks were found in the tanks of the vessel and no oil was noticed outside the vessel. At the anchoring site, a leak to the engine room was detected in the hydraulics unit of the KaMeWa, and therefore the vessel could not use her stern thruster. A Coast Guard patrol arrived onboard at 03:00. A breath-analyser test was conducted on the master, the pilot and the chief engineer and the result was 0‰ to all concerned. The Coast Guard did not notice any oil damage.

## **1.3 Rescue operations**

Two tugboats were ordered to the vessel and with their help the PAULINE RUSS moored at berth no. 4 at 06:24.

### **1.3.1 Alerting activities**

After the vessel had anchored, the pilot used the VHF at 02:25 to notify the VTS that the vessel had KaMeWa problems, which may have been caused by the buoy getting under the vessel or the vessel perhaps touching the bottom. The VTS notified the Helsinki MRSC of the event at 02:27.

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<sup>1</sup> Telephone conversation with the pilot on 1 November 2005.



## **2 ANALYSIS**

### **2.1 Wind conditions when entering the port**

The wind was not unusually strong. The wind was from the south, and it has to be taken into consideration that the wind was almost from the bow during the reversing (Figure 4.). The pilot had taken this into consideration when he suggested a turn in the harbour basin. The master did not reply to this, which proves that he did not consider the direction of the wind to be significant. The master should have noticed the effect of the wind, when the pilot, for the first time, suggested that the approach to the pier be interrupted. However, afterwards the master was of the opinion that the grounding was due to the strong, gusty wind. The effect of the wind on the manoeuvring cannot be analysed in more detail without the information on the movements of the vessel registered onboard.

### **2.2 Bridge co-operation**

The master has a lot of experience of Hanko and he is used to independent work on the bridge without tugboat assistance. The investigation has revealed that the master did not communicate sufficiently with the pilot when entering the port. The master did not react to the suggestions on interrupting the approach. The ISM Code requires for the company to draw up Safe Management System (SMS) instructions for its vessels. The SMS instructions of the vessel were not made available to the investigators, and so nothing can be said about the way in which bridge co-operation has been described. Despite instructions, constructive communication forms the basis of co-operation. Pilot Card and checklist for boarding pilot are available and in use.

### **2.3 Registered data**

The electronic chart system (ECDIS) of the vessel registers data on the path and position of the vessel. The investigators requested this recording from the company to investigate the exact path and position of the vessel. However, the ECDIS recording was not made available to the investigators.







### 3 CONCLUSIONS

According to the investigator, the factor contributing to the accident was a lack of bridge co-operation, which resulted in a deficient estimate of the wind conditions on the manoeuvrability of the vessel.

The master needs from the company clearer support for decision-making regarding the use of tugboats. A good tool to determine the need for a tugboat and to determine the wind limit would be a desk-top computer simulator<sup>2</sup>

The vessel lacked clear operating procedures on co-operation between the master and the pilot.

#### **Company SMS improvements:**

Independent from this incident and within the Companys continuous improvement process of their SMS and Loss Prevention Policy the following actions are in progress:

1. The company has started to send Masters and Chief officers to a Bridge management and shiphandling courses.
2. The company has started to man their ships with an additional 3<sup>rd</sup> officer, to ensure a Chief mate always companion the Master during all manoeuvring in ports.
3. The company is working on a 'port passage plan' for all harbours, with berthing manoeuvres for different wind and weather conditions to assist Masters to have a complex 'in advance' overview of possible hazards to find the right decision during berthing under difficult conditions including the need of tugboats. This passage plan will include clear instructions for cooperation with pilots.
4. The company has started to install VDR onboard all their ships.

#### **Decision made by the Accident Investigation Board**

The Accident Investigation Board has agreed on executive assistance with other authorities to make the data recorded by the VDR or by other technical equipment available to the investigators.

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<sup>2</sup> MS SUPERFAST VII, grounding off Hanko on 12.11.2004, Appendix 2, investigation report B 7/2004 M, ISBN 951-836-175-4





#### 4 RECOMMENDATIONS

Due to the deficient investigation material, the Accident Investigation Board does not make any recommendations.

Helsinki 20.10.2006

A handwritten signature in black ink, appearing to read 'Juha Sjölund', written in a cursive style.

Juha Sjölund

A handwritten signature in black ink, appearing to read 'Karl Loveson', written in a cursive style.

Karl Loveson

A handwritten signature in black ink, appearing to read 'Kari Larjo', written in a cursive style.

Kari Larjo

## **LIST OF SOURCES**

The following sources are stored at the Accident Investigation Board:

1. The Maritime Accident Notice with Appendices
2. The record of hearing the master and the pilot.