

Investigation report

C5/2009M

M/V EMSRUNNER, grounding off Kalajoki on 11.12.2009

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 or liability caused by the accident. The investigation report should not be used for purposes other than the improvement of safety.



SUMMARY

Cyprus flagged M/V EMSRUNNER arrived in ballast from Sweden to load peat in port of Rahja at Kalajoki in Finland. After taking the pilot on Kalajoki pilot boarding place the vessel grounded under pilotage, outside of fairway area, into the shoal of Välimatala.

The vessel got tears to the bow ballast tank to her port side, dents to the fore peak area, tears to the bilge keel and some dents to bottom plates on starboard side. Furthermore there were some damages in the bow thruster room. There were no leakages or environmental damages.

After investigations performed in the harbour by the Maritime authority and classification society, installation of an additional pump into the bow thruster room and giving the detailed casualty report, the vessel got the permission to sail to repair shipyard in Estonia, where the damages were repaired.



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ABBREVIATIONS

Abbreviation	Name in English	Name in Finnish
AIB	Accident Investigation Board of Finland	Onnettomuustutkintakeskus
DSC	Digital Selective Call	digitaalinen selektiivikutsu
GMDSS	Global Maritime Distress and Safety System	merenkulun hätäliikennejärjestelmä
GPS	Global Positioning System	globaali satelliittipaikanmääritys
DGPS	Differential GPS	Differentiaalinen GPS
IMO	International Maritime Organisation	YK:n kansainvälinen merenkulkujärjestö
ISM	International Safety Managament code	kansainvälinen merenkulun turvallisuusjohtamiskoodi
MKL		Merenkulkulaitos
MRSC	Maritime Rescue Sub-Center	meripelastuslohkokeskus
OTKES		Onnettomuustutkintakeskus
RACON	Radio transponder	Tutkamajakka
STCW	Standards of Training Certification and Watchkeeping	IMOn koulutuksen-, pätevyyksien- ja vahdinpidon yleissopimus
UTC	Universal Time Co-ordinated	koordinoitu yleisaika
VDR	Voyage Data Recorder	matkatietojen tallennin
S-VDR	Simplified VDR	pelkistetty matkatietojen tallennin
VTS	Vessel Traffic Service	meriliikenteen ohjauspalvelu



FOREWORD

The Cyprus-flagged M/V EMSRUNNER was en route from Västerås, Sweden, to Kalajoki in Finland. Soon after taking the pilot onboard, the vessel grounded in the shoal of Välimatala in front of the Rahja harbour on the morning of 11 December 2009. The pilot and the Master were on the bridge.

The ship got cracks to the bow ballast tank on her port side and the bilge keel, and was dented in the bottom plates on starboard side and in the steering thruster room and the bottom.

On the same day, the Accident Investigation Board issued an investigation decision (C5/2009M) on launching an investigation into the grounding of the vessel. The ship's flag state, Cyprus, announced that they would not perform a separate investigation. Instead, Cyprus was ready to assist the Finnish investigation.

Marine Accident Investigator Risto **Repo** from the Accident Investigation Board was appointed Chairman of the Investigation Board, and investigators Kaarlo **Heikkinen** and Hannu **Martikainen** as members. The Board called psychologist Matti **Sorsa** to act as an expert. The investigation report has been translated into Swedish and English by Multidoc.

After receiving information on the event, the Accident Investigation Board informed the vessel's flag state and the state of origin of the recognised organisation. Performing the investigation in Finland was agreed upon with the flag state (Cyprus) and the state of origin of the recognised organisation (Germany). The AIB launched a preliminary investigation on the event on the following day, while the vessel was docked in the Rahja harbour.

The times listed in the investigation report are in local time (LT). The source material for the investigation report is stored with the Accident Investigation Board.

Statements concerning the Investigation. Under the Act (79/1996) section 24 concerning accident investigation, the final draft of the report was sent for statement to the Finnish Transport Safety Agency Trafi's Regulation and supervision sector's Maritime safety department, Finnish Transport Agency's Waterways department and to the Finnish State Pilotage Enterprise Finnpilot and for possible comments to the owner and shipping company of the M/V EMSRUNNER, to the pilot and Cypriot accident investigation administration. The statements are available at the end of this investigation report.



1 COURSE OF EVENTS AND INVESTIGATION

1.1 The ship

The ship in question, M/V EMSRUNNER, is a dry cargo ship built in 2006 at the Bodewes Shipyards B.V docks in Hoogezand, the Netherlands.



Picture 1. The ship, M/V EMSRUNNER

(© Aleksi Lindström)

The ship is owned by Unibulk Shipping Co. Ltd, Cyprus, and its Company is Hermann Buss GmbH & Cie KG in Germany. The ship is registered under the Cypriot flag.

1.1.1 General information

The general information is based on the documents received in the preliminary investigation; the certificates of registration and inspections of the ship, the pilot card, and the report on damage by sea.

Name of the ship	M/V EMSRUNNER		
Registry port	Limassol		
Flag of the ship	Cyprus		
Register no.	090541		
IMO no.	9342152		
Call sign	C4QN2		
Owner	Unibulk Shipping Co Ltd.		
Type of ship	Dry cargo ship		
Max. length	106.86 m		
Width	15.20 m		
Draught	5.25 m (in ballast: 4.0 m)		
Gross/ Net	4,102 t/ 1,852 t		
Carrying capacity	7,184 t		
Engine power	2,030 kW		
Speed	12.5 knots		
Propulsion	One adjustable-pitch propeller, fore propeller: 300 kW		
Rudder	One, +45/–45 degrees, Hard-over time: 18 sec.		
Place and year of construction	Bodewes Shipyards B.V, 2006		
Classification society	Germanischer Lloyd		
Class	100 A5 E2 with freeboard 1.35 m		
Ice class	E2 (Ice strengthening)		



1.1.2 Crew

When the ship left Västerås, she was carrying a multi-national crew of eight (8). The Master, first mate, chief engineer and able seaman were Polish. The rest of the crew consisted of one Lithuanian and three Ukrainian seamen. The official language onboard was English, but other languages were used as necessary. The ship was manned in accordance with the Minimum Safe Manning Document.

During the event, the Master and an AB operated as the watch crew. After taking the pilot aboard, the bridge was manned by the Master and Pilot.

1.1.3 Bridge and bridge equipment

The general layout of the bridge is open and enables a full 360 degree view of the surroundings.



Picture 2. General layout of the bridge

The necessary operating equipment – i.e. engine control, manoeuvring, communication, lights, fog horn, and the monitoring and alarms – are installed onto the control desks at the front of the bridge. The front area also has two workstations and chairs with separate radar screens.



M/V EMSRUNNER, grounding off Kalajoki on 11.12.2009



Picture 3. Control desk, Port radar screen.



Picture 4. Control desk, SB radar screen.



1.1.4 Machinery and engine room

The ship has one main engine (MAK 6 M 25, power: 2,030 kW).

1.1.5 Other systems

The other systems onboard did not affect the course of events.

1.1.6 Passengers and cargo

There were no passengers onboard. She was sailing in ballast to load peat from the Rahja harbour.

1.2 The accident

1.2.1 Weather conditions

At the moment of the accident, the weather was foggy. According to the pilot, visibility was extremely poor, less than 200 metres in Rahja. High pressure dominated and the air was humid and the sea calm. Due to the relatively mild air and humidity close to the surface of the water, the radar targets were extremely easy to detect, i.e. the radar conditions were good.

The sea level was -9 cm.

Location	Time	Tempera- ture	Wind	Air pressure	Humidity
Rahja harbour	0737	-7°C	0/0	1,030.9 mbar	98%
Tankar	0800	-4.4°C	195°/2.2 m/s	1,030.3 mbar	97%
Ulkokalla	0800	-1.9°C	221°/5.2 m/s	1,029.7 mbar	97%

Table 1. Weather data on the accident area

1.2.2 The voyage and its preparation

The vessel left Västerås, Sweden at 4.24 p.m. on 9 December 2009 (UTC+1) in ballast to load peat in the Rahja harbour. According to the Master, he was informed about the voyage 6–8 hours before departure. The journey was planned using the British Admiralty general chart no. 2301. The voyage could only be planned up until the Kalajoki pilot boarding place, because the ship did not have a detailed map from the pilot boarding place to the harbour.



The Master said he had been to the Bay of Bothnia a few times before, but never to Rahja harbor. Anything out of the ordinary happened en route from Västerås to the Kalajoki pilot boarding place.

The pilot was informed of the upcoming task on the previous day, and he was picked up from his on-call site in Kokkola at 6.15 a.m. (UTC+2). The pilot left the Rahja fishing harbour onboard a pilot cutter towards the pilot boarding place at approximately 7.15 a.m. Poor visibility delayed reaching the ship. The pilot cutter reached EMSRUNNER at approximately 8.10 a.m.

1.2.3 The scene of the accident

The ship grounded on the Välimatala shoal to the north of the fairway¹. The shoal is marked with three spar buoys. According to the map, the depth in the middle of the shoal is 3.9 metres.

The navigational aid descriptions for the spar buoys are listed in the Table below. The "Kaarlo" ice buoy is at the beginning of the fairway, as also described in the Table.



Picture 5. The location and area of the accident.

¹ Finnish Maritime Administration fairway 370; the Rahja harbour fairway



Type/name of the navigational aid	Location ² Lat/Lon		
Ice buoy "Kaarlo" S			
 lighted ice buoy with a fixed radar reflector in the upper part 	64°15.401'	23°33.3802'	
Spar buoy "Välimatala" W			
 Unlighted west cardinal mark with internal radar reflector 	64°16.7849'	23°33.6248'	
Spar buoy "Välimatala" N			
 Unlighted north cardinal mark with internal radar reflector 	64°16.6279'	23°36.395'	
Spar buoy "Välimatala" E			
 Unlighted east cardinal mark with internal radar reflector 	64°15.8694'	23°37.999'	

Table 2. Navigational aids close to Välimatala.

Pilot boarding place

The Tankar pilot boarding position³, approximately 22 miles Southwest of the end of the Kalajoki fairway, was previously used as the pilot boarding position for traffic from South. The Raahe pilot boarding position, at a distance of approximately 40 miles, was used for traffic from North.

On request by Finnpilot, FMA decided in October 2008 to establish a new pilot boarding position in Kalajoki approach. Finnpilot stated that the reasons for establishing the new pilot boarding position were related to further developing the operations as well as the savings incurred to the customers by comparison to the previous practice.

In connection with the investigation, the investigators were informed that after the new pilot boarding place was introduced, there have been other cases where a vessel has been in danger of drifting into Välimatala. Any reports made of these incidents were not available to the investigators.

At the same time as the introduction of the new pilot boarding position, Finnpilot decided to acquire cutter services from a local towing company.

The new Kalajoki pilot boarding place⁴ is located in the Bothnia Pilot area at 64°16,00' N and 023°30,00' E, at the end of the fairway to the south of the illuminated Kaarlo South buoy.

² EUREF-FIN coordinate system, source: FMA navigational aid register

³ Interview with the management of the Finnish State Pilotage Enterprise Finnpilot, 30 March 2010

⁴ Finnpilot Dno. 2316/510/19 Dec 2008



1.2.4 The accident

After the changing of the watch at 7.00 a.m. as the vessel approached the pilot boarding position, the EMSRUNNER's Master called the pilot several times with several calls⁵ on the VHF channels 13, 16, and 67. Neither the pilot station, nor the VTS replied. The pilot cutter replied after EMSRUNNER called it by the name "Rahja Pilot" at 7.44 am, at which time the Master announced that the ship would be at the pilot boarding place in 15 minutes and asked about the installation of the pilot stairs.

The ship was at her final waypoint at the pilot boarding place at the agreed time of 8.00 a.m. and continued with a course of 075 degrees at 7 knots speed. After ten minutes, the pilot boarded the ship approximately 8 cable lengths⁶ east-northeast from the pilot boarding place on the map. As the pilot arrived on the bridge, the ship's heading was 075 degrees and speed 5 knots. The pilot confirmed the location of the ship in relation to the radar target on the left from the radar, and confirmed full speed to the Master as well as the heading along the fairway, 080 degrees.

During the following five minutes, the pilot and the Master discussed issues related to the harbour, docking, and manoeuvring the ship.

At 8.17 a.m., the pilot received a phone call. One of the pilot's colleagues was following the ship's progress in the AIS service and had noted that the ship was not on the fairway and she was heading towards Välimatala. The colleague announced his discovery to the ship in the call. The pilot doubted this and begun to inspect the location of the ship on the radar. After a pair of minutes he called the Pilot cutter's operator and requested confirmation of the ship's location on the cutter's radar.

Within approximately one minute, the pilot received confirmation that the EMSRUNNER was in danger of steaming onto the Välimatala shoal. The Pilot cutter's operator requested the pilot to turn the ship due South.

After the call, the pilot requested the speed to be reduced to half for some time, and set the new heading as 120 degrees to the autopilot.

The Master carried out the requested engine command. The ship's first bottom contact took place almost immediately after this, at 8.22.02⁷. The speed of the vessel at grounding was approximately 10 knots.

The vessel continued on her course, making more bottom contacts, until she stopped within approximately one minute.

The extracts of the VDR recording that the investigators considered the most important along with their texts are gathered as an appendix to this report⁸, starting from the cutter's approach, and ending with the grounding. (Appendix 1)

⁵ "Tankar Pilot / Kokkola Pilot / PILOT L-112 / Rahja Pilot /... this is Emsrunner calling Pilot"

 $^{^{6}}$ Cable length = 1/10 miles, 185.2 metres

⁷ Time from the VDR record



1.2.5 Action after the event

After the grounding, the Master launched the internal damage control for the ship, and ordered to confirm the status of all ballast and other tanks. The inspections revealed that two ballast tanks on the Port side of the bow were torn, and the bow thruster room was damaged.

The pilot notified the cutter of the grounding, and requested the cutter to arrive to the location to inspect the vessel for external damages and any oil leaks. The pilot also notified the VTS centre of the accident, and requested the information to be forwarded to the Maritime Rescue Co-Ordination Centre and other concerned parties.

1.2.6 Personal damage

No physical injuries.

1.2.7 Damage to the ship

On the day after the accident, inspections performed and photographs taken by divers noted that the ship was dented in the fore peak area on the Port side, and torn on the left ballast tank area between frames 120–125. Other damage included dents on the SB side between frames 85–109, a tear in the bilge keel on frame 87, and dents around the bottom. In addition, two propeller blades were damaged.

According to the information available to the investigators, the estimated repair costs amount to approximately $\notin 330,000^9$





1.2.8 Other damage

No other damage.

⁸ APPENDIX 1

⁹ Estimate by the representative of the shipping company and master.



1.2.9 Fire

There was no fire.

1.2.10 Navigation and communication equipment

The following navigation and communication equipment was used and in full operational condition:

Radar X-band (3 cm)	Sperry Marine	
ARPA display unit	Bridgemaster E	
Radar X-band (3 cm)	Sperry Marine	
ARPA display unit	Bridgemaster E	(*
Echo sounder	ELAC LAZ 5100	(*
Magnetic compass	Cassens & Plath	
Gyro compass	Anschütz Standard 22	(*
GPS compass	Sperry Marine NAVISTAR	
Speed log	Consilium	(*
GPS receivers (2)	SAAB AIS GPS (R4)	(*
Autopilot	Anschütz Pilotstar D	
AIS transponder	SAAB AIS	(*
VHF+DSC equipment	SAILOR	(*
Other GMDSS equipment	SAILOR	
Portable radiophones		

(* Connected to the VDR recorder

1.2.11 Registering equipment

Onboard there was a Rutter S-VDR voyage data recorder in full operating condition. The representative of the shipping company copied the record onto an external memory device in connection with the preliminary investigation, and handed the copy to the investigators. A programme was acquired from the equipment manufacturer in Canada for the decoding of the VDR recordings.

1.2.12 Operation of the VTS and monitoring systems

The Kalajoki fairway is in the operating area of the Bothnia VTS. Monitoring of the marine traffic and the view of the situation in front of Kalajoki and the fairway are based on the information received from the AIS transponders¹⁰ of the ships. The VTS service in Finland distributes information and, if necessary, organises sea traffic, but does not issue navigation instructions.

¹⁰ AIS equipment is required in all passenger vessels with 300 gt and above on international waters, and with 500 gt and above in Domestic traffic. The AIS system enables the monitoring of the location and movement of ships from the fixed monitoring network and from other ships.



The pilot did not reply when called on VHF by the Master of the EMSRUNNER. Bothnia VTS had no active role in the event. The pilot calls of the Master of the EMSRUNNER¹¹ could be heard in the VTS centre, but help was not offered. VTS continuously listens to channels 16, 67, and 13. The VTS Master's Guide and the Vessel Traffic Service Act¹², lists the notifications issued to vessels as necessary.

Preliminary investigation was started immediately after the Accident Investigation Board was informed of the accident, and a request for records for investigation was sent to Bothnia VTS.

A real-time AIS display of the area was acquired through the Internet after the Accident Investigation Board was informed of the accident at 09.13.

1.2.13 The harbour, its equipment, and the fairway equipment

The Rahja harbour is located in Kalajoki on the shore of the Bothnian Bay. The harbour area and its buildings are mainly owned by the town of Kalajoki.

The port operator is a private enterprise. Approximately 100 ships visit the harbour every year. Of the 350,000 tons of freight traffic, 80 % comprises of export. The main export articles are sawn timber and horticultural peat.

The Rahja harbour fairway

A fairway with a draught of 8.5 metres runs to the harbour directly from the open sea. The far end of the fairway is approximately 5.5 kilometres South from Maakalla. The fairway runs from the south side of the Kaarlo ice buoy and from the North side of the Lepänen buoy, via the Roima fixed marker to the Rahja harbor. There are two radar beacons¹³ on the fairway: Äijänkallio in the beginning of the fairway, and Roima at its East end. (APPENDIX 2)

The Finnish Transport Agency and the town of Kalajoki share the responsibility for the maintenance of the fairway. The fairway and all navigational aids were in full operating condition.

The Välimatala shoal to the North of the fairway is marked with three lateral marks with internal radar reflectors.

 ¹¹ Changes were being made in the VHF system of the Bothnia VTS, which meant that the VTS record did not include VHF traffic for interpretation.
 ¹² The Firstleh Viscol Tartilla Carrier Act (Alueliikan and black) as 200 of 2005.

¹² The Finnish Vessel Traffic Service Act (Alusliikennepalvelulaki), no. 623 of 2005

¹³ RACON



1.3 Rescue operations

1.3.1 Alarm operations

The pilot notified Bothnia VTS of the navigation error through the VHF radio at 8.26 a.m. Later, the pilot called in to report that the ship was aground. VTS notified MRSC Vaasa, where the issue was then attended to. VTS and MRSC share facilities and are manned with personnel from the Finnish Border Guard.

1.3.2 Starting the rescue operations

MRSC Vaasa received an emergency call about an uncertain situation at 8.30 a.m. According to the announcement, the EMSRUNNER had been navigating outside the fairway under pilotage, and was possibly aground.

Finnish Border Guard Unit RV 332 from Kalajoki was sent on site to confirm the situation.

MRSC Vaasa informed the Maritime Administrations inspectors of the incident at 8.37 a.m. When the situation was assessed, the person on duty at Finland's Environmental Institute, SYKE and the Accident Investigation Board were notified at 9.13 a.m.

After the communication with the County Administrative Board Rescue inspector, at 11.09 a.m., the MRSC was informed, that the Kalajoki Rescue department¹⁴ was on its way to the site of the accident.

1.3.3 Rescuing the ship

Divers from the Kalajoki Rescue department were transported to the site of the accident, and they inspected the hull of the ship externally. With the preliminary investigation of the damage to the ship, preparations for releasing the ship were started. The ship came loose from the shoal at 5.12 p.m. with the help of the tugboat JAKOB. The ship was transported to the Kalajoki harbor using her own engines, with support from the tugboat. The EMSRUNNER was moored at 7.00 p.m.

1.4. Special inspections

1.4.1 Investigation onboard and at the site

No special inspections were performed at the site of the accident.

The AIB launched a preliminary investigation after receiving information of the accident. Due to the late hour of arriving to the quay, the investigation was delayed until the following morning, at which time it was started together with FMA, the Classification society, and the representatives of the Shipping company. Divers ordered by the Classification society performed the underwater inspections and took the necessary

¹⁴ The Kalajoki unit from the Jokilaaksot Rescue services



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photos to find out the extent of the damage. The divers drafted a drawing of the damage to the bottom and hull structures. Material for the damage report and accident investigation was collected with the help of the ship's officers.

The investigator interviewed preliminarily the Master and first mate to hear the course of events as told by them.

The equipment of the bridge was photographed, the radio log was inspected, and the operational condition and certificates of the navigation and radio equipment were confirmed.

The investigator received the requested copies for all documents necessary for the preliminary investigation.

1.4.2 Technical investigations

Separate technical investigations were not performed.

1.4.3 Hearing the crew

A description of the voyage, co-operation with the pilot, and the actions of the crew during and after the incident were formed through hearing the Master and first mate in connection with the preliminary investigation and from the maritime declaration.

The Pilot, the operator of the pilot cutter, and other persons involved were heard during the course of the investigation.

1.4.4 Organisations and management

The Finnpilot management and a representative of TraFi, the authority that monitors pilotage operations, were heard in the investigation.

The **Finnish State Pilotage Enterprise**, **Finnpilot**, is a state enterprise operating under the Ministry of Transport and Communications. The operation of Finnpilot is regulated in the act on the Finnish State Pilotage Enterprise, (938/2003), and the Pilotage Act, (940/2003). Finnpilot operates throughout Finland. The target service level set by the Ministry is a maximum of two hours of waiting time on sea areas, and six hours in the Saimaa region. A Government decree regulates Finnpilot's pilotage fees. The pilotage operations are not subject to VAT.

For the purposes of risk management, Finnpilot drafts estimates on the probability of damage and its economic impacts. According to the Tort Liability Act (412/1974), Finnpilot is not liable for damage caused when a ship is under pilotage.

Within the past years, Finnpilot has striven to rationalise the pilotage operations. In 2008, a development project was arranged. The most important change was to increase the mobility of pilots and cutter operators within their pilotage area. The pilots in the



Kvarken region, for example, will now acquire pilot licences for all main fairways in their area from Kalajoki to Kristiinankaupunki.

Development methods were not directed at the methods of pilotage per se.

In summer 2008, Finnpilot acquired electronic nautical charts for the pilots, with the intention of improving the safety of pilotage. The individual pilots may decide on whether or not they wish to use these charts.

The global economic situation is mirrored on the demand for pilotage, and on Finnpilot's turnover. The demand has decreased approximately 30 per cent within one year, and the turnover of Finnpilot has decreased by 26 per cent from 2008. Finnpilot also estimates that the changes in the traffic flow may well be long-term, even permanent.

At the end of November 2009, Finnpilot's management dismissed 11 employees for production- and economy-based reasons. Five pilots were made redundant from the Saimaa canal and Lake Saimaa pilotage area as well as three pilots and one cutter operator from the Gulf of Bothnia pilotage area, one pilot from the Sea of Archipelago pilotage area, and one part-time cleaner from the Sea of Bothnia pilotage area.

1.4.5 Requesting a pilot

The valid Finnpilot instructions¹⁵ on the procedures for pilotage requests for ships arriving in Finnish harbours are as follows:

Providing preliminary information and submitting a request

The vessel's agent provides the Pilot Order Centre with weekly lists and any changing preliminary information via email or fax.

The vessel's agent or vessel provides the Pilot Order Centre with advance notice of the vessel's arrival at the pilot boarding place 24 and 6 hours before arrival via order form, email, fax or telephone.

Issuing the request

The ship's agent or the ship will submit their binding pilotage request to the Pilot Order Centre 3 hours prior to the vessel's arrival at the pilot boarding place via order form, email, fax, or telephone.

If necessary, the pilot contacts the ship via VHF when the vessel is less than 1 hour away.

1.4.6 The shipping company

The ship is owned by Unibulk Shipping Co. Ltd, Cyprus, and her shipping company is Hermann Buss GmbH & Cie KG in Germany

¹⁵ http://www.finnpilot.fi/www/luotsintilaus/en_UK/providingpreliminaryinformation/



1.4.7 Other investigations

The investigators have studied the portable electronic nautical chart equipment that was acquired for the pilots, as well as their usability.

1.5 Regulations and statutes governing the operations

As regards statutes, the EMSRUNNER accident was related to pilotage and voyage planning. There are national and international regulations regarding these issues. The international ISM code requires shipping companies and/or operators to issue instructions on bridge work.

1.5.1 International agreements and recommendations

At the STCW convention in 1978, IMO ordered that voyage must always be planned from harbour to harbour. The same requirement was repeated in 1995 in more detail¹⁶.

IMO requires that pilots must hold a certificate of competency, and that they must receive the training necessary for their work. IMO does not offer instructions on pilotage but has issued the requirement in 1987¹⁷ that the Master must exchange information with the pilot before pilotage begins.

1.5.2 National legislation

In Finland, a requirement for Voyager planning is presented in the Decree on the Manning of Ships, Certification of Seafarers and Watch keeping no.1256/1997 (invalidated). The Decree does not offer instructions on voyage planning. The current Pilotage Act no.940/2003, and the Pilotage Decree 92/1998 (invalidated) do not discuss voyage planning or the practical pilotage work. They do not require voyage planning. Bridge cooperation is also not required, as this is only considered to be a recommendation.

1.5.3 Authority regulations and instructions

The Finnish Maritime Administration issued instructions on voyage planning in 1995, but they were removed from the list of valid decisions in 1998. New instructions have not been issued.

The pilotage instructions were issued in 1988 and renewed in 2000. The instructions required that the pilots should have extracts from the nautical charts with markings for radar navigation. These instructions were the first to discuss bridge cooperation. These instructions were removed from the list of valid decisions by FMA at the turn of 2003–2004.

¹⁶ The IMO Resolution A.285 suggested that the master must also draft a voyage plan for the part of the voyage under pilotage. This resolution was made into a regulation in the IMO STCW convention in 1978. The STCW convention was amended in 1995.

¹⁷ IMO res. A.601 (15) 1987, Annex 1; PILOT CARD, Appendix 2, WHEELHOUSE POSTER.



1.5.4 Operator regulations

According to the ISM code, the shipping company must draft instructions for bridge work. The investigators have received a copy of the shipping company's bridge work instructions for M/V EMSRUNNER, including operating instructions under pilotage (Standing Orders, Bridge).

In these standing orders, the shipping company emphasises close cooperation with the pilot, and the fact that the Master or officer in charge of the navigational watch are always ultimately responsible for the safe manoeuvring of the ship. The pilot is only an advisor.

The Finnish State Pilotage Enterprise FINNPILOT

According to Finnpilot, a route plan is available for each fairway that is to be piloted. In addition, every pilot has his/her personal plans.

1.5.5 Quality systems

At the time of the incident, Finnpilot did not have a quality system in place. The authority responsible for pilotage and the customers did not require such systems at the time.

Finnpilot uses a reporting system for incidents, related to pilotage reporting, in which any unusual events can be entered after each pilotage mission. The unusual events can be classified as a technical malfunction on the ship, a close call, collision with a pier, or collision with a navigation beacon, for example.

According to the information given to the investigators, approximately one to two incidents per month are reported. According to the incident report statistics received from Finnpilot, 65 reports were registered between 26 January 2009 and 30 April 2010.

The incidents are discussed in station meetings, and they are posted in the Intranet for a larger group if necessary.

The shipping company operating EMSRUNNER does not have a quality system in place.



2 ANALYSIS

2.1 Human factors

It became apparent in the investigation that there were no technical malfunctions in the ship that would have affected the course of events. Neither did the external conditions make manoeuvring the ship exceptionally difficult. Therefore, the human factors present at the time were concentrated on. The most significant of these were the deficiencies in the awareness of the situation of the pilot and the bridge crew, rendering the making of correct decisions extremely difficult.

2.1.1 Awareness of the situation

As the pilot boards the ship to be piloted, quick and correct management of the awareness of the situation is required. In this context, awareness of the situation means several things: perceiving the location of the ship, understanding the space needed for the manoeuvring of the ship, sufficient knowledge about the navigation and manoeuvring equipment, evaluation of one's own competence and alertness, and the simultaneous evaluation of the competence and alertness of the ship being piloted.

Such awareness is a prerequisite for operative decision-making. Pilotage decisions based on an incorrect understanding of the situation can only lead to the correct result very randomly.

Several factors affect the management of awareness of the situation, such as situationspecific circumstances, e.g. the time of day, weather, and the waters, as well as the equipment of the ship and the competency of the bridge crew. Also, the pilotage methods and related experience and familiarity can affect awareness of the situation. From a wider perspective, the operating culture also affects the quality of the awareness of the situation.

In practice, favourable awareness of the situation can only be achieved through combining information received from the various navigational equipment with the pilot's internal view of the situation as based on the Pilot's memory, and through communicating efficiently with the other experts in the situation.

In this case, the facts clearly show that the pilot had an erroneous view of the location of the vessel when he boarded the bridge. This view was neither doubted nor confirmed through discussion with the pilot cutter operator. After the Pilot arrived to the bridge, he confirmed his view by checking one source of information – the radar view of the ship. The bridge crew i.e. the Master of the ship did not participate in the definition of the location; he trusted the Pilot to be fully aware of the exact location of the ship. This procedure also corresponded to the operating culture in pilotage, meaning that none of the persons involved in the situation considered the pilot to have acted in an unusual manner.



M/V EMSRUNNER, grounding off Kalajoki on 11.12.2009

The Pilot did not have portable tools in addition to the ship's equipment to confirm the location in the visibility conditions at the time¹⁸.

Human factors, such as the reluctance to change or alter a view already formed of the situation, reduces the awareness of the situation. An internal image that is not questioned requires strong contrary information to be changed.

Good practices in a situation such as pilotage, do require constantly questioning one's predefined views in a healthy way. A poor state of alertness or other factors that impede concentration on the task at hand usually reduce the readiness to question one's operation methods critically.

Therefore, safe operative procedures emphasise the monitoring of operations between people, which in turn requires efficient communication procedures. In this case, that would have meant active discussion between the pilot and the cutter operator, and further active monitoring of the situation by the ship's Master and Pilot.

However, the pilotage traditions emphasise individual performance, which means that communication is not adequately appreciated. Communication would also have required that documents such as the voyage plan and nautical charts had been examined together. Examining these documents together with the crew of the vessel under pilotage is not a part of the traditional operating methods of pilotage.

Only shortly before the incident, the Pilot had received information that he would be dismissed from his work, and had recently recovered from influenza. These factors must have put strain on the situation. Both issues were likely to decrease the Pilot's ability to concentrate on the assignment at hand.

The location of the ship close to a shoal increased the importance of the awareness of the situation. The safety margin was thin and required swift and certain location and observation of the space needed for the manoeuvring of the vessel in a dynamic situation.

2.1.2 Decision-making and operation

The decision-making situation was created when the Pilot's colleague called the ship and informed the Pilot that he had noted from AIS that the ship was too far to the North. The Pilot later related that he considered himself better aware of his location than the colleague, but that he decided to confirm the location from the operator of the pilot cutter just in case he was wrong. No changes to the heading were made at this point, and the ship's master was not informed of the colleague's suspicions. It took some time for the operator of the pilot cutter to turn on the radar view. After seeing the location of the ship

¹⁸ In spring 2008, Finnpilot acquired electronic sea chart equipment for the pilots, to be used as an additional method of improving the safety of pilotage, due to the constantly updated chart material. The employer had not issued instructions on the usage of the equipment. Most pilots do not use the equipment, as they deem it impractical. Some pilots use a personal chart device, which, according to the users, is more practical. According to the information available to the investigators, the equipment acquired by Finnpilot would be more effective and more practical if the start-up and necessary preparations were not so time-consuming.



on radar, the operator issued a direct order to turn the heading directly due south. The Pilot reacted by requesting the engine power to be momentarily reduced to half, and turning the vessel Starboard. The first bottom contact took place almost immediately after this.

The decisions were made at a calm pace, which speaks for the difficulty experienced by the Pilot in changing his view of the situation, regardless of the feedback received. He did not understand that the situation called for a swift and determined decision of changing direction and speed, or the need for active communication with the Master.

2.2 The role of the VTS centre

According to the investigators, the cooperation between the traffic control and pilotage service is not active, which is evident in the small role of VTS in the case under examination, for example. The VHF traffic monitoring and calling help on other channels were passive. As the ship drew past the pilot boarding position and closer to Välimatala without changing direction, VTS could have notified the ship's Master or officer of the watch and the Pilot about the impending danger.

The ship's Master did not seem overly worried even though the pilot station did not reply to his calls. The Master used several names for the station on the various channels, which proves that the Master erroneously assumed that the Pilot could be contacted through VHF.

According to the investigators, the absence of VHF listening in the current pilotage onduty system is confusing and deviates from the international procedures. People have not been sufficiently informed of the changed practice. This view is confirmed by the several attempts by the Master of the EMSRUNNER to contact the pilot through VHF. According to the valid distribution of frequencies¹⁹, channel 13 is still reserved for pilot connections.

According to the investigators, the similarity and locations of the navigational aids on the fairway and the Välimatala spar buoys were misleading when locating the ship based on radar view alone, when the ship was in the location the Pilot arrived at the bridge.

2.3 Pilotage practices

When the pilot arrived on the bridge of the EMSRUNNER, he greeted the Master, who was alone on the bridge. The pilot then requested "Full ahead" and confirmed the location of the ship on the radar display, mumbling "OK, this should be here and this...".

¹⁹ Ficora decree on the use of marine VHF channels in Finland ("MERI-VHF-KANAVIEN KÄYTTÖTARKOITUKSET SUOMESSA"), (3 May 2010), only available in Finnish

C5/2009M



The pilot did not question his view of the location of the ship or discuss the matter with the Master. This kind of individual operation corresponds to the general practice, but does not conform to the IMO resolution on pilotage²⁰.

Annex 2 of the resolution lists standard routines. The Master and pilot must prepare for the pilotage, including the following:

- agreeing on a voyage plan
- considering the circumstances, other traffic, and the speed of the ship
- agreeing on matters that affect the manoeuvring of the ship.

As the pilot boards the vessel, the Pilot Card should be examined. The Company's instructions for the EMSRUNNER²¹ emphasise close cooperation with the Pilot, and the readiness to question actions performed or suggested by the Pilot.

Finnpilot has drafted an notice/fact sheet for each fairway where pilotage is needed, to be issued to the masters of arriving ships. The announcement includes the necessary information on the fairway and harbor, and can be used as a tool for creating a shared view of the pilotage, which can then be used as a basis for monitoring the Pilot's operations.

All this takes time, which in this case was neither reserved nor used. The Pilot ordered full speed after arriving to the bridge, probably to confirm that pilotage had begun. Therefore, pilotage was initiated without a shared and confirmed view on the location and the correct heading.

2.4 The Pilot boarding place and the fairway

Pilotage at Kalajoki was previously managed from Raahe and Kokkola. Ships coming from the South took aboard a Pilot in front of Kokkola, and ships from the North took the Pilot aboard in front of Raahe. This practice was changed in 2008, when Finnpilot suggested to the FMA that the Pilot boarding position be moved to its current location, and changed the procedure so that all Pilot transports to and from the vessel were carried out with a cutter from Rahja.

Some local Pilots have criticised the location of the current Pilot boarding position, and suggested that it should be moved further out to the sea.

The investigators concluded that the Rahja fairway is not difficult to manoeuvre and there are no problematic bends, but the Pilot boarding position is located too close to the beginning of the fairway.

The Rahja fairway and the surrounding sea areas are clearly marked. The navigational aids have not been changed recently, and their locations and operation are monitored

A.483(XII), Training, Qualifications and Operational Procedures for Maritime Pilots other than deep-sea pilots.
 Standing Orders, Bridger Caling with Pilot

²¹ Standing Orders, Bridge; Sailing with Pilot



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regularly. According to the investigators, the similarity and locations of the navigational aids on the fairway and the Välimatala spar buoys was misleading, when locating the vessel based on radar view alone when the ship was in the position the Pilot arrived at the bridge.

This accident has proven that even slight delays by the Pilot can significantly reduce the time available for the required preparation of the pilotage together with the ship's bridge crew, thereby reducing the required safety margin.



3 CONCLUSIONS

As the Pilot boarded the EMSRUNNER, he had an erroneous understanding of the location of the vessel. This view was strengthened when the Pilot saw the radar targets on the ship's radar, and they corresponded to his expectations. The Pilot operated alone, leaving the ship's Master with no opportunity or need to question the Pilot's operations.

When the Pilot's colleague contacted the Pilot and voiced his suspicions concerning the ship's location, the Pilot continued to trust his own view of the interpretation of the radar targets, but did contact the pilot cutter just in case. According to the additional information from the cutter, the Pilot requested the speed to be decreased and began to slowly turn the ship to Starboard.

During the entire event, the Bothnia VTS did not offer the EMSRUNNER any help as it called for the Pilot, nor did it later participate in the management of the dangerous situation.

The Pilot's state of alertness was likely to be lower than usual, due to his recent illness and having recently learned that he would be dismissed from his job.

The location of the Pilot boarding position did not leave any safety margin for any delays in the Pilot boarding the ship.



4 ACTIONS PERFORMED

No safety actions that could prevent this kind of incident from reoccurring were brought to the attention of the investigation.



5 SAFETY RECOMMENDATIONS

The location of the pilot boarding position in Kalajoki does not leave any safety margin for any delays in the pilot boarding the ship.

The investigation commission recommends the following to the Finnish Transport Safety Agency Trafi's Regulation and supervision sector's Maritime safety department:

 In order to increase the safety margin, the Kalajoki pilot boarding position should be moved further out to the Sea from its current location. This would create better circumstances for cooperation between the Pilot and the ship's bridge crew before the pilotage is launched.

During the entire event, the Bothnia VTS did not offer the EMSRUNNER any help as it called for the Pilot, nor did it later participate in the management of the situation.

The Vessel Traffic Service is separated from the pilotage operations. The VTS centres have plenty of resources for supporting pilotage and improving the safety of navigation.

The investigation commission recommends the following to the Finnish Transport Agency's Waterways department and to the Finnish State Pilotage Enterprise Finnpilot:

2) Operators in the vessel traffic services and pilotage should increase the amount of cooperation in the operative practices. This would help to prevent dangerous situations and close calls.

The incident showed that the Pilot based his work purely on individual operation. Bridge cooperation; efficient communication, creating a shared view of the situation, and monitoring based on the basis of that shared view can only be successful after achieving a standard level of routine through sufficient training. This level cannot be achieved without practicing and intense utilisation of simulators.

The investigation commission recommends the following to the Finnish State Pilotage Enterprise Finnpilot and to the Finnish Transport Safety Agency Trafi's Regulation and supervision sector's Maritime safety department:

3) Simulators should be used in the training and maintenance of expertise of pilots more efficiently than they currently are being used. The efficiency of communication on and from the bridge, efficient use of modern equipment, and control over the critical parts of the fairways should be emphasised.

Helsinki, 3 March, 2011

Risto Repo

Kaarlo Heikkinen

Hannu Martikainen

Matti Sorsa



PICTURES FROM THE VDR RECORD





Picture 2. At 7.33 a.m. the EMSRUNNER with heading 075.3°, directly towards the pilot boarding place, which is 5.47 nm away. The cutter as an ARPA target (42) near the Äijänkallio RACON.



Picture 3. At 8.00 a.m. the ship is 0.3 nm from the pilot boarding place; WAYPOINT APPROACH ALARM. The cutter in the front to the right, ARPA target 42. The Äijänkallio RACON in SE.



Picture 4. At 8.04 a.m. the cutter is approaching the ship on the right side of the aft of the ship; heading 168.3°, distance: 0.37 nm. Heading of the ship: 075.6°, speed 5.2 knots.



Picture 5. At 8.10 a.m. the pilot is boarding the ship on the left side. The radar echoes to the north of the ship are from the Maakalla and Ulkokalla islands.



Picture 6. At 8.12.11 a.m. the pilot arrives to the bridge, greets the Master, and ensures the location of the ship in relation to the radar target on the front left from the radar. He then confirms the speed to the Master ("Full ahead"), and gives 080 degrees as the heading. At 8.12.45 The pilot asks for the draught of the ship, which the Master confirms as four metres.



Picture 7. At 8.13.27 the pilot confirms his previous assumption of the location of the ship from the radar. He asks the Master for the maximum speed of the ship, the Master confirms this as 12 knots.



Picture 8. At 8.14.35 the heading of the ship has changed from 080 to 086 without separate orders. The pilot cutter departs for the harbour.



Picture 9. At 8.15 a.m. discussion on the manoeuvring, engines, etc., as well as the weather.



Picture 10. At 8.17.34 the pilot's phone rings. The colleague calls from the pilot station, saying that the EMSRUNNER is heading towards Välimatala.



Picture 11. At 8.18 a.m. the pilot states on the phone that the Kaarlo ice buoy is on the port side of the ship, doubts the colleague's observation, thanks him, and finishes the call.



Picture 12. At 8.20.51 a.m. the pilot calls the cutter operator and confirms the ship's location in relation to the Kaarlo ice buoy. The cutter approaches the Kaarlo ice buoy.



Picture 13. At 8.21.10 the pilot discusses the situation with the cutter operator. The true location of the ship is revealed, and he states that he will turn the ship to the south as suggested by the cutter operator. At 8.21.40 The pilot requests the Master to temporarily decrease the speed to half.



Picture 14. At 8.22.02 the first bottom contact takes place. Speed: 10.3 knots, heading: 101.3°, bearing: 095.4°, rate of turn: 23.6°/min. The cutter remains by the Kaarlo ice buoy.

Appendix 1/8 (8)

Conning Page	Conning Page	Conning Page
Date 11 Dec 20 Time 06:22:02 G	D09 Date 11 Dec 2 MT Time 06:22:10 G	2009 Date 11 Dec 2009 GMT Time 06:22:15 GMT
Latitude 64* 16,22 Longitude 23* 35,54 GPS Mode DG	"N Latitude 64*16,2 "E Longitude 23*35,5 PS GPS Mode D0	1' N Latitude 64* 16,21' N 9' E Longitude 23* 35,62' E GPS GPS Mode DGPS
Heading 101.3 Autopilot COG 095.4 SOG 10.3 Kn ROT 23,67/ Depth	• T Heading 104. Autopilot	3* T Heading 106,1* T Autopilot 11* T COG 100,8* T nots SOG 9.9 Knots //min ROT 23,5*/min N/A Doubt N/A
Conning Page	Conning Page	Conning Page
Date 11 Dec 20 Time 06:22:20 GM	09 Date 11 Dec AT Time 06:22:55	2009 Date 11 Dec 2009 GMT Time 06:23:00 GMT
Latitude 64*16,21 Longitude 23*35,65 GPS Mode DGF	NLatitude64*16,ELongitude23*35,PSGPS ModeC	20' NLatitude64' 16,20' N,76' ELongitude23' 35,76' EJGPSGPS ModeDGPS
Heading 108,2* Autopilot COG 102,4*	Heading 120 Autopilot 120 COG 012	D,6*T Heading 120,6*T Autopilot 2007 COG 251,1*T
SOG 9.7 Knc ROT 24,7 /m Depth N	ts SOG 0.1 in ROT 2.6 /A Depth	Knots SOG 0.1 Knots Wmin ROT 0.0 Ymin N/A Depth N/A

Picture 15. From 8.22.02 the movement factors and rate of turn between the first bottom contact and the time the ship stopped.



Picture 16. The ship continued on her course, making more bottom contacts, until it stopped within approximately one minute.

TRACK CHART FOR THE RAHJA HARBOUR

Väylän perusseloste (WebMap-tuloste)

Nimi Rahjan sataman väylä ID 296	Tila	Vahvistettu	Väylänro 370 VATUnro 75
Kulkusyvyys (m) 8.5 / 5.8 (8.5) Haraussyvyys (m) 10 / 9.5 / 10.5 Väylänhoitoalue	Piiri Merialue Omistaja	Länsi-Suomi Perämeri Liikennevirasto / Kal	Valaisu Valaistu Väylälaji Meriväylä Jajoen kaupunki
Alkaa Meri, noin 5,5 km Maa Päättyy Rahjan satama, Kalajol	akallan E-p ki	uolella	
Väyläluokka VL1: Kauppamerer Väylänhoitoluokka A Tekninen luokka T1 Navi luokka	nkulun 1-lk	: väylä	Väyläpituus (km) - koko väylä 11.6 - MKL osuus 10.9 <u>Väylän turvalaitteet (lkm)</u> 41
Lisätieto			
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Tulostettu 29.01.2010 / Oracle-tietokanta