



Statens haverikommission
Swedish Accident Investigation Board

ISSN 1400-5735

SUMMARY of Final report RS 2011:01es

*Fire onboard the ro-ro passenger ferry Sea Wind on
Finnish waters south of Mariehamn, 2 December 2008*

Case S-211/08

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Statens haverikommission (SHK) Swedish Accident Investigation Board

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Statens haverikommission
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1 July 2011

S-211/08

Swedish Transport Agency
Maritime Department
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Report RS 2011:01es

The Swedish Accident Investigation Board (Statens haverikommission, SHK) has investigated an accident that occurred on 2 December 2010, involving the ro-ro passenger ferry *Sea Wind*.

The investigation has been followed by the Accident Investigation Board of Finland. A representative from the Rescue Service of Egentliga Finland has participated in the investigation.

In accordance with section 14 of the Ordinance on the Investigation of Accidents (1990:717) the Board herewith submits a final report on the investigation.

The Board will be grateful to receive, by 1 October 2011 at the latest, particulars of how the recommendations included in this report are being followed up.

Carin Hellner

Ylva Bexell

**Copy of the full report to the Swedish Maritime Administration
and the Swedish Transport Agency, Aviation Department.**

1 VESSEL AND VOYAGE DATA

1.1 Ship particulars

<i>Flag/register</i>	Swedish
<i>Vessel's name</i>	<i>Sea Wind</i>
<i>call sign</i>	SDNE
<i>IMO number</i>	7128332
<i>Vessel data</i>	
<i>Type of ship</i>	Ro-ro and rail passenger ferry
<i>New building shipyard/year</i>	Helsingør Skibsværft, Danmark 1972, rebuilt 1984 and 1989
<i>Gross tonnage</i>	15 879
<i>Length, over all</i>	154 m
<i>Beam</i>	22 m
<i>Draft, max</i>	5,22 m
<i>Deadweight at max draft</i>	3 500 dwt
<i>Main engine, output</i>	7 350 kW
<i>Propulsion arrangement</i>	4 x MaK 8M 453 connected in pairs to two propeller shafts, two variable pitch propellers
<i>Rudder arrangement</i>	Two conventional rudders
<i>Service speed</i>	17 knots
<i>Ownership and operation</i>	Tallinn Swedish Line
<i>Classification society</i>	DNV +1A1 Car Ferry A Ice 1B EO

1.2 Voyage particulars

<i>Ports of call</i>	Stockholm – Åbo (Turku), on regular timetable
<i>Type of voyage</i>	Regular voyage
<i>Cargo information/ passengers</i>	Trailers, railway trucks 11 passengers
<i>Manning</i>	28 crew

1.3 Marine casualty or incident information

<i>Type of marine casualty or incident</i>	Fire in engine room
<i>Date and time</i>	December 2 2008, at 01.29 hours
<i>Position and location of the marine casualty or incident</i>	10 M South of Mariehamn, Finnish waters. pos. 59°55,7'N 019°53,4'E
<i>Weather conditions</i>	Calm easterly winds 4-6 m/s, visibility 5-8 km, sea 0,2 – 0,4 m
<i>Other factors</i>	None
<i>Consequences</i>	
<i>Personal injuries</i>	None
<i>Environment</i>	None
<i>Vessel</i>	Extensive damage to the engine room

1.4 Summary

Sea Wind departed from Åbo for Stockholm at 20.00 on 1 December 2008 in accordance with its regular timetable. The journey progressed normally and in calm weather. There were 28 crew members and 11 passengers on board. The bridge was manned by a duty officer and a watchkeeper, and the engine department was manned by a duty 2nd engineer and a motorman. All four main engines (ME) were in use for the ships propulsion and the electrical power came from the main switch board which was supplied by the port shaft generator.

The time was 01.29 in the morning and *Sea Wind* had just left the archipelago of Åland and was heading in the open sea. The 2nd engineer on duty was in the engine control room when a violent fire broke out in the area between ME1 and ME2 in the adjacent engine room. At the same time the fire alarm for the engine department went off on the bridge. The 2nd engineer immediately contacted the bridge by the internal telephone system to confirm that there was a fire in the engine room. Thereafter the engineer started the auxiliary engines in order to maintain the ship's electrical power before stopping the main engines, but it was not possible to synchronize these with the power mains because of the fire. The engine control room quickly filled with smoke and he was finally forced to leave by an escape route. The motorman had evacuated the engine room somewhat earlier. Before the engineer left the engine room, he activated the emergency stop for all engines which resulted in a blackout of the vessel. The emergency generator started automatically, as it should, which restored some of the electrical power, i.e. fed from the emergency switch board.

The master, who was immediately called to the bridge, gave the order to send out a Mayday. The ship's emergency plan was also activated and the various safety teams quickly gathered at their stations. The first attempt to quench the fire was made by using the fixed CO₂ fire fighting system. When the system was released a leakage was found on the main CO₂-pipeline within the CO₂ release room which had to be evacuated. When a team of fire fighters after a while were sent down to the control room they could establish that while the fire had been dampened by the CO₂ it was not out. Several unsuccessful attempts were then made by the ship's fire fighting teams to manually activate the fixed local fire protection

system (water sprinkler) above the main engines, but the system could not be started. A team of firefighters working from an adjacent space also tried to cool the fire with water, but that attempt failed due to problems with a watertight door in between the spaces.

Not until a fire fighting team in the engine control room succeeded in synchronizing the ship's auxiliary engines with the main switch board, and by that restoring the ships power after nearly two hours, the water sprinkler system started automatically and the fire was put out.

No one was injured by the fire or while fighting it, but the 2nd engineer suffered breathing difficulties from the smoke that had engulfed the engine control room before he left.

The incident resulted in a major rescue effort led by the Finnish SAR-centre, MRCC Turku. The operation involved both Finnish and Swedish helicopter resources, as well as specially trained firemen (RITS) from both countries. Several merchant ships also took part. The 11 passengers onboard were evacuated at 04.10 by a Finnish helicopter, following the master's decision in consultation with the shipping company, after the fire was extinguished. The ship, which was disabled as a result of the fire, made fast a tug boat at 05.20 and was eventually towed to Åbo harbour for repairs.

The investigation showed that the fire onboard *Sea Wind* was caused by oil from the fuel oil system either spurting out or spraying from a broken pipe onto hot surfaces of the main engine No. 1. The pipe broke from fatigue, after having vibrated freely for some time as the differential pressure gauge to which the pipe was attached was loose. The ignition was made possible by a flaw in the thermal insulation of the hot surfaces on and round the main engine No. 1.

Contributing to the outbreak of the fire was that the crew had not noticed and repaired the loose gauge. The classification society and national maritime administration had also approved the vessel without ensuring that the low pressure section of the fuel oil system was screened off, which was a SOLAS-requirement. It is also possible that the thermal insulation on and around the main engine No. 1 was inadequately checked.

Contributing factors as to why the fire could not be extinguished at an early stage were various malfunctions in technical systems on board, deficiencies in the crew's knowledge of how certain technical systems were constructed and functioned, as well as inadequate fire drill routines.

The investigation also revealed several deficiencies in the capacity of the Swedish SAR helicopter system and the prerequisite of the helicopters' effective use, especially during winter and in the dark, and particularly when visibility was restricted. The Finnish component of the rescue effort has not been investigated in a similarly rigorous manner, as such falls outside the mandate of SHK.

1.5 Recommendations

The Swedish Transport Agency is recommended; when testing fixed fire fighting installations, as a routine, test these in all different modes of operation (*RS 2011:01, R1*).

The Swedish Transport Agency is recommended to improve their routines when it comes to inspection of how shipping companies and ships' crews use risk assessment and risk analysis in accordance with the requirements of the ISM-Code and national work environment regulations (*RS 2011:01, R2*).

The Swedish Transport Agency is recommended to claim from the shipping company updated drawings of the electrical system of *Sea Wind*, as well as a plan showing how the company will ensure that relevant parts of the crew has sufficient knowledge and control over the ship's electrical system to ensure safe operation (*RS 2011:01, R3*).

The Swedish Transport Agency is recommended to claim for better fire drill routines on *Sea Wind* to ensure these becomes more complete regarding what basic measures is to be taken in case of a fire and comprising all relevant fire extinguishing systems installed onboard (*RS 2011:01, R4*).

The Swedish Transport Agency is recommended to draw up routines for internal control of what other conditions has been approved for a vessel before making new approvals, to avoid conflicts between various approvals and to avoid that approvals are made on insufficient basis (*RS 2011:01, R5*).

The Swedish Transport Agency is recommended to speed up the work to complete a national regulation for airborne SAR including inspection requirements (*RS 2011:01, R6*).

The Swedish Maritime Administration is recommended to reconsider their present requirements regarding de-icing systems on helicopters purchased for SAR-service, to ensure that the helicopters can be used under conditions normally prevailing on northerly latitudes during winter (*RS 2011:01, R7*).

The Swedish Maritime Administration is recommended to ensure that the required equipment to facilitate search-operations from helicopter during dark hours is installed in the SAR-helicopters as soon as possible (*RS 2011:01, R8*).

The Swedish Maritime Administration is recommended to work for, in international co-operation, that the airport of Mariehamn has a preparedness to be opened at short notice outside its normal opening hours (*RS 2011:01, R9*).