



## *Final report RS 2016:10e*

KERTU – Grounding at Landsort, Stockholm County, on 29 October 2014

Reference no. S-178/14

29 November 2016

SHK investigates accidents and incidents from a safety perspective. Its investigations are aimed at preventing a similar event from occurring in the future, or limiting the effects of such an event. The investigations do not deal with issues of guilt, blame or liability for damages.

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## General observations

The Swedish Accident Investigation Authority (Statens haverikommission – SHK) is a state authority with the task of investigating accidents and incidents with the aim of improving safety. SHK accident investigations are intended to clarify, as far as possible, the sequence of events and their causes, as well as damages and other consequences. The results of an investigation shall provide the basis for decisions aiming at preventing a similar event from occurring in the future, or limiting the effects of such an event. The investigation shall also provide a basis for assessment of the performance of rescue services and, when appropriate, for improvements to these rescue services.

SHK accident investigations thus aim at answering three questions: *What happened? Why did it happen? How can a similar event be avoided in the future?*

SHK does not have any supervisory role and its investigations do not deal with issues of guilt, blame or liability for damages. Therefore, accidents and incidents are neither investigated nor described in the report from any such perspective. These issues are, when appropriate, dealt with by judicial authorities or e.g. by insurance companies.

The task of SHK also does not include investigating how persons affected by an accident or incident have been cared for by hospital services, once an emergency operation has been concluded. Measures in support of such individuals by the social services, for example in the form of post crisis management, also are not the subject of the investigation.

## The investigation

SHK was informed on 29 October 2014 that a serious marine casualty involving M/S KERTU with registration number 9125683/9HA3671 had occurred off Landsort, Stockholm County, that same day at 4:15 a.m..

The accident has been investigated by SHK, which has been represented by Jonas Bäckstrand, Chairperson, Rikard Sahl, investigator in charge, Dennis Dahlberg and Ylva Bexell, operational investigators, Alexander Hurtig, behavioural sciences investigator and, until 31 May 2015, Urban Kjellberg, fire and rescue service investigator.

This is a joint investigation together with the Marine Safety Investigation Unit of Malta and it has been led by SHK.

Dr. Kevin Ghirxi has participated as an advisor/coordinator for the Marine Safety Investigation Unit of Malta and Erik Sandberg has participated on behalf of the Swedish Transport Agency until 1 September 2015, when he was succeeded by Patrik Jönsson.

*Investigation material*

Interviews have been conducted with the crew on board KERTU and with staff from the Swedish Coast Guard, the Swedish Transport Agency and the Swedish Maritime Administration.

A meeting with the interested parties was held on 3 May 2016. At the meeting SHK presented the facts discovered during the investigation, available at the time.

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**Vessel data**

Flag state/register of shipping	Malta
Identity	
IMO number/call sign	9125683/ 9HA3671
Vessel data	
Type of vessel	General cargo vessel
Yard/year of build	1996
Gross tonnage	2,844
Length overall	89.77 metres
Breadth	13.17 metres
Draught, max	5.68 metres
Deadweight at max. draught	4,224 tonnes
Propulsion system	Variable-pitch propeller
Lateral propeller	Bow thruster
Rudder system	Conventional
Service speed	11 knots
Ownership and management	Hansa Ship Management Ltd. Tallinn, Estonia
Classification society	Germanischer Lloyd
Safe manning	9

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**Information on the journey**

Ports of call	Bålsta (SE) – Kokkola (FIN)
Type of voyage	International
Cargo information/number of passengers	Ballast voyage
Crew	9

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**Information about the marine casualty**

Type of marine casualty	Grounding
Date and time	29 October 2014, 4:15 a.m.
Position and site of the marine casualty	N 58°45.7' E 017°53.4'
Weather	South-westerly wind 16 m/s and rough seas
Other circumstances	Grounding just after the pilot disembarked
Consequences	A major rescue operation lasting for a long time.
Injuries to persons	None
Environment	Various reports of oilspill varying from 3 to 19.5 m <sup>3</sup>
Vessel	Total loss of the vessel

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Figure 1. KERTU aground. Photo: SVT.

## SUMMARY

The general cargo vessel KERTU was on a voyage from Bålsta, Sweden to Finland with pilot on board. Shortly after the pilot had left the vessel in bad weather with rough seas inside the compulsory pilotage line, she grounded hard at a speed of 9.8 knots. The area's VTS centre understood what had occurred and made contact with the vessel, which had not requested any assistance at this point. The VTS<sup>1</sup> then raised the alarm with the Swedish Maritime Administration's joint rescue coordination central (JRCC<sup>2</sup>), the Swedish Transport Agency and the Swedish Coast Guard. The VTS (which is part of the Maritime Administration) also raised the alarm with other functions within the Maritime Administration.

After some hours on the ground, the master of the vessel called the Coast Guard and JRCC and informed them that the vessel was leaking diesel oil. The Coast Guard sent one of its vessels to the site of the accident and established that there was a smell of diesel and that the vessel was manoeuvring with its engine running. No inspector from the Transport Agency nor a pilot was sent to the location. The master of KERTU has stated that, in addition to the two occasions on which he was in contact with the VTS and the one occasion he made contact himself with the Coast Guard and the JRCC, the vessel was not contacted by any government authorities during the first four hours after the grounding.

After being aground for four hours, the vessel manoeuvred itself afloat and set a course towards an anchorage out at sea south of Landsort. After a two-hour voyage, KERTU anchored and 30 minutes later, the vessel advised that water was leaking into the cargo hold and that the water level was two metres and rising. Subsequently, the JRCC changed the classification from NIL<sup>3</sup> to distress

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<sup>1</sup>VTS – Vessel Traffic Service – the Maritime Administration's information centres for maritime traffic.

<sup>2</sup>JRCC – Joint Rescue Coordination Centre, the air-sea rescue centre.

<sup>3</sup>NIL – Used when the rescue coordinator assesses that the alarm is not reliable or that nothing which constitutes a threat to human life has, or may have, happened, i.e. not a search and rescue situation.



and the crew, with the exception of the master and the chief engineer, were evacuated to a nearby coast guard vessel. By this time, seven hours had passed since the grounding occurred and the vessel's situation was critical and there was a high risk that it would capsize. In conjunction with the evacuation, it appears that the Transport Agency, in practice, began a MAS operation<sup>4</sup>. Following this, a major effort was undertaken to prevent the vessel capsizing, primarily using units from the Coast Guard at the location alongside KERTU in consultation with the Transport Agency's marine inspectors, who participated from shore. While the operation was taking place, the Coast Guard organised several consultation meetings with the county administrative board and municipality concerned.

The situation was stabilised after several hours. The vessel was promised a berth in the Port of Oxelösund and a salvage coordinator engaged by the shipping company arrived on board and the vessel was then towed to the quay in Oxelösund. The impact resulted in major damage to the vessel and, after temporary reinforcement work lasting several weeks by the quay in Oxelösund, the vessel was considered as total loss and was towed to a yard to be scrapped. No one was physically harmed in connection with the accident or during the rescue operation.

SHK concludes that the grounding was caused by unclear communication concerning the vessel's position and future route in conjunction with the disembarkation of the pilot, combined with misunderstanding between the master and the officer on watch on board.

In addition, SHK concludes that the subsequent sequence of events was close to leading to loss of the vessel and action could have been taken to reduce this risk. The fact that the Transport Agency did not act in accordance with its own routine descriptions in the first ten hours, following the grounding influenced events negatively and hindered the actions of other authorities and organisations.

When the Transport Agency's MAS function well began to act, this was a factor which, together with the Coast Guard's operational effort, came to be crucial to save the ship from sinking.

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<sup>4</sup>MAS – maritime assistance service. The purpose of this type of function is to be a point of contact between a vessel that, while not in distress at sea, is in need of assistance and various authorities concerned as well as to monitor and track the vessel's situation.

## Safety recommendations

### **Hansa Shipmanagement Ltd. is recommended to:**

- Actively follow up and improve procedures for safe route planning and communication on the bridge, both with and without a pilot on board. See section: 2.3. (*RS2016:10 R1*)

### **The Swedish Maritime Administration is recommended to:**

- Actively follow up procedures and training regarding disembarkation of pilots and guidance from pilot boats, combined with the conditions for tracking inside of the compulsory pilotage lines from the VTS, where possible. See sections: 2.2, 2.2.1, 2.2.2, 2.4, 2.6.1, 2.6.4. (*RS2016:10 R2*)
- Actively follow up procedures and training for staff at the JRCC regarding communication with vessels at risk, weather conditions, classification of cases and risk analyses in conjunction with serious maritime accidents. See sections: 2.5, 2.6.1, 2.7. (*RS2016:10 R3*)
- Consider and evaluate the appropriate number of VHF channels during pilotage and appropriate communications between vessel and pilot boat during the embarkation and disembarkation of a pilot. See sections: 2.2.1, 2.6.2. (*RS2016:10 R4*)
- Consider and evaluate the feasibility and advantages of clearly visualising the compulsory pilotage lines in relevant publications. See section: 2.6.3. (*RS2016:10 R5*)

### **The Swedish Coast Guard is recommended to:**

- Evaluate and consider the installation of recording functionality with respect to all communications at its control centres. See section: 2.9.1. (*RS2016:10 R6*)

### **The Swedish Transport Agency is recommended to:**

- Taking this report into consideration, conclude its ongoing operational analysis regarding maritime supervision in conjunction with major maritime accidents, taking particular account of factors that may have an impact on maritime safety. See sections: 2.6.1, 2.10, 2.10.1, 2.10.2. (*RS2016:10 R7*)
- Evaluate and consider clearer internal procedures and training, primarily with respect to functions and organisation in conjunction with maritime accidents. See sections: 2.6.1, 2.10, 2.10.1, 2.10.2. (*RS2016:10 R8*)

- Ensure that the Transport Agency maintains around-the-clock readiness for using marine inspectors and MAS with the relevant expertise in the event of maritime accidents in Swedish waters. See sections: 2.6.1, 2.10, 2.10.1, 2.10.2. *(RS2016:10 R9)*

**The Swedish Transport Agency is recommended, in consultation with the Swedish Maritime Administration and the Swedish Coast Guard, to:**

- Work out clearer common procedures and working practices, primarily those pertaining to the MAS function in the event of major maritime accidents. See sections: 2.9.1, 2.10.1, 2.7. *(RS2016:10 R10)*
- Introduce, in an appropriate manner, regular joint exercises concerning major maritime accidents. See section: 2.1. *(RS2016:10 R11)*

**The Ministry of Enterprise and Innovation is recommended to:**

- Evaluate applicable legislation concerning vessels port of refuge, particularly as regards the authority to order a port to accept a vessel in distress and financial guarantees for ports. See section: 2.11. *(RS2016:10 R12)*
- Evaluate applicable legislation concerning MAS, protected places and vessels in need of assistance. See section: 2.10.1. *(RS2016:10 R13)*

**The Ministry of Justice is recommended to:**

- Evaluate applicable legislation concerning the boundary between central government and municipal responsibility for the fire and rescue service in ports and channels in conjunction with maritime accidents. See section: 2.11.1. *(RS2016:10 R14)*

## 1. FACTUAL INFORMATION

### 1.1 Account of the sequence of events

#### 1.1.1 *The pilotage*

On the evening of 28 October 2014, KERTU in ballast condition, departed from Bålsta, which lies in Lake Mälaren, for Kokkola, Finland, with a pilot on board. The vessel passed through the lock in Södertälje around midnight and then continued the voyage towards Landsort (a total of 60 M<sup>5</sup>) with the same pilot on board. The wind at Landsort had been stable south-westerly at about 15 m/s for a few days and, for this reason, the swell was expected to be high out at Landsort. The pilot has stated that during the time in the Södertälje lock he showed the master and later the second officer and chief officer a position to leave the pilot that was appropriate for the weather conditions and also an appropriate course out from the planned disembarkation position<sup>6</sup> south of Gunnarstenarna.

When KERTU arrived at the western side of Landsort, the VTS operator began tracking the vessel.

Having arrived at the eastern side of Landsort, the pilot communicated with the pilot boat a few times about a suitable place for disembarkation. When it was time for the pilot to leave the vessel, the master took position by the autopilot and the pilot instructed the master to steer 045° when the pilot disembarked with the aim of sheltering the pilot boat on the leeward side of KERTU. The master did not respond to the pilot. On this occasion, the pilot did not inform KERTU of the current position or which new heading the vessel should steer once the pilot has disembarked.

The chief officer accompanied the pilot down to the pilot ladder while the master was left alone on the bridge. The time at this point was 4:10 a.m. Shortly after the pilot had come down onto the pilot boat, one of the boat men<sup>7</sup> on the pilot boat noticed that KERTU had not made the turn to starboard and was instead continuing on a northerly heading, which resulted in the boat man calling KERTU on the VHF radio and informing her that she should turn immediately to starboard on an easterly heading. KERTU responded that she intended to turn to 060°, at which point the pilot boat corrected this to “heading 090°, starboard”, which KERTU repeated “OK 090°”. The pilot boat then set a course north towards Ankarudden in order to leave the pilot there for onward transport home. At the same time, the VTS operator started another mapping aid in order to see the depth conditions at the location more clearly and to track KERTU out and past Gunnarstenarna.

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<sup>5</sup>M – Nautical mile = 1,852 metres.

<sup>6</sup>Disembarkation of the pilot – when the pilot leaves the vessel.

<sup>7</sup>The crew onboard the pilot boat is called boat men and is often rotating as master of the pilot boat.

Because of this, his concentration was not focused on KERTU over the following few minutes. AIS recordings show that KERTU turned to a heading of 067° and then, some minutes later, grounded hard at a speed of 9.8 knots at 4:15 a.m. by the reef “Fudden”, east of Landsort.



Figure 2. The area around Landsort. The red track is KERTU's. The blue track is the pilot boat's. The arrow mark the position of the grounding. The islands to the right in the image are Gunnarstenarna.

### 1.1.2 *The period aground*

Around 30 seconds after the grounding, the VTS in Södertälje called the pilot boat on VHF channel 68 and shortly after, also called KERTU, without obtaining a response. Some minutes later, the VTS operator raised the alarm with the JRCC<sup>8</sup> and others within the Swedish Maritime Administration who are to be informed in the event of an emergency in accordance with internal procedures and the checklist used in the event of groundings.

At 4:27 a.m., KERTU responded to the VTS operator and informed them on VHF channel 68 that *“we have run aground and are manoeuvring in order to enable us to continue the voyage”*. The VTS asked whether KERTU was OK and received the response: *“I don't know”*.

At 4:44 a.m., the VTS called the JRCC again and informed them that KERTU had run aground and that *“the vessel is not taking in water at present”*. They agreed that the JRCC would contact the Swedish Transport Agency's officer on duty and the Swedish Coast Guard, which took place immediately. The JRCC classified the alarm as NIL, i.e. no search and rescue mission.

The Transport Agency's officer on duty almost immediately contacted the on-call marine inspector on duty in the area, who then began to get acquainted with the situation and investigated the possibilities for coordinating transport out to the disabled vessel in conversations with

the VTS and the Coast Guard's NE<sup>9</sup> command centre. The Coast Guard decided to send its vessel KBV 311, which had an approximately two-hour voyage to the site of the accident.

At 6:25 a.m., the JRCC contacted the VTS in order to check the situation and asked for KERTU's phone number. However, the VTS operator did not have any phone number available. Both were relying on KBV 311 "probably" being able to obtain a phone number for KERTU when she had reached the site of the accident. Following this, the VTS called up KERTU on VHF and asked if there was any oil leak, which then was confirmed by KERTU. The VTS operator also asked how the situation on board was otherwise, but received no response to this question.

At 6:30 a.m., the Coast Guard's rescue coordinator decided to initiate a rescue operation. The grounds for this decision were that there was judged to be an imminent risk of environmentally damaging emissions. The Coast Guard's rescue coordinator decided to send two environmental protection vessels and a specialised boarding force to the location in order to rescue the disabled vessel. Just after this decision was made, the VTS informed the Coast Guard by telephone that KERTU was leaking oil.

At 6:38 a.m., the JRCC received an incoming telephone call from the master on board KERTU. The following was noted in the JRCC log: *"KBV [Coast Guard] south-west connects through a call from the master on KERTU. He sounds somewhat nervous and jumpy. Poor English. I inform him that help is on its way. KBV 311 will soon be with him. Connect him through to the Coast Guard VB<sup>10</sup> north-east".* During this conversation the JRCC informed the master that *"they have all the information and help is on its way"*.

During this telephone call, which took place at 6:44 a.m., the master informed the Coast Guard's control centre that the vessel was leaking diesel oil from a damaged 30-tonnes tank.

At 7:00 a.m., the Transport Agency's marine inspector on duty was informed that KERTU was leaking oil, that KBV 311 would soon be on site and that it was not possible to board the vessel because of the strong swell.

At 7:29 a.m., KBV 311 informed her control centre that *"She is under power using the propeller to withstand the wind. Streaks of fuel can be seen and there is a strong smell of diesel. The oil is drifting up towards Mysingen"*.

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<sup>9</sup>At the time of the accident, the Coast Guard had two different command centres; one in Gothenburg – SW – and one in Stockholm – NE – with Stockholm (i.e. NE) being the command centre that took action in this case.

<sup>10</sup>VB – Officer on the watch.

The information that KERTU was under power using the propeller was not passed on to the VTS, the Transport Agency or the JRCC. KBV 311 made no contact with KERTU, either on VHF or by telephone. At the same time, the Coast Guard informed the County Administrative Board of Stockholm. At this time, the swell was violent, with waves up to four metres high and the wind was south-westerly between 10 and 15 m/s. Because of the bad weather, KBV 311 left the site of the accident and moored nearby at Ankarudden at 7:56 a.m..

At 8:10 a.m., the Transport Agency's marine inspector on duty handed over the case to a colleague, with information that the colleague would go on board the vessel when it became possible to do so safely.

At 8:13 a.m., the Marine Police contacted the JRCC and during this call, the police officer stated that the information was that there was a four-metre swell in the area, something that the JRCC, according to the recordings of calls, does not seem to have been aware of at that time.

### **1.1.3 Voyage away from the site of the grounding**

At 8:32 a.m., the VTS received indications via both AIS<sup>11</sup> and radar that KERTU was making speed through the water. The VTS called the vessel and asked what her intentions were. KERTU responded that she intended to go to the large anchorage. The VTS confirmed this by responding "*OK you intend to go to the VLCC<sup>12</sup> anchorage*". Shortly thereafter, KERTU set a course south, not east to where the VLCC anchorage is located.

The Coast Guard's rescue coordinator called KERTU's master on the telephone about 10 minutes after the vessel had detached herself from the ground by using her own engine. At this point, the master was very stressed and was asked if he had made an inventory of the damage and had the situation under control. After making VHF contact with the VTS, the master was to go to the anchorage and undertake an inventory of the damage. The Coast Guard's rescue coordinator informed the master that two large environmental protection vessels were on their way to assist and they would arrive within about three hours.

On her voyage south, around 30 minutes after KERTU had detached herself from the ground, she passed on the wrong side of the cardinal mark Bulan and close to a 7.7-metre reef. The VTS called the vessel and asked what her intentions were regarding Bulan. KERTU responded that she was on her way to the anchorage to anchor.

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<sup>11</sup>AIS – Automatic Identification System – a system that makes it possible to identify a vessel and track its movements from other vessel and from land-based stations such as VTS centres.

<sup>12</sup>VLCC – very large crude carrier – anchorage for large tankers.

At 8:45 a.m., the JRCC obtained information that the vessel had detached herself from the ground. The VTS also informed the Transport Agency and the Coast Guard. The marine inspector on duty from the Transport Agency consulted with the Coast Guard and they planned to allow the vessel to search a port of refuge in Nynäshamn after having transferred the oil from the damaged centre tank to the wing tanks. The Coast Guard made the first outline decision (BIS 1): *“Stop the outflow of oil and then escort with environmental protection vessels to Nynäshamn”*.

Around 10:00 a.m., an initial collaboration meeting was held with the County Administration Board of Stockholm, the City of Stockholm and Nynäshamn Municipality, including the municipal fire and rescue service. At the same time, the Transport Agency’s marine inspector on duty, in consultation with the Coast Guard, changed the plans for the port of refuge to apply to Oxelösund instead because the harbour was considered to be a better option in this situation. The Coast Guard established that the bulk of the diesel oil spill was at the site of the grounding and in a band stretching from there up towards the island of Skrapan.

#### **1.1.4 At the anchorage**

The Coast Guard was in contact with KERTU several times over the course of the day. The contact the VTS and the JRCC had with KERTU took place exclusively on VHF. KERTU informed the VTS at 10:38 a.m. that she had anchored at the anchorage south of Landsort. At 11:18 a.m., KERTU informed the Coast Guard that she had a water level of two metres in the cargo hold, that the level was rising and that her own pumping capacity could not cope and she therefore required immediate assistance. The VTS received this information and contacted the JRCC immediately. The VTS informed the JRCC that the pilot boat at Landsort had a pilot on board and was ready to go out to the vessel in distress in order to assist.

#### **1.1.5 Search and rescue (SAR)**

At 11:23 a.m., the JRCC changed the classification from NIL to alert and one minute later, classified the case as distress. Contact was established with the vessel on VHF and the master stated that he wanted to go into port somewhere. At the same time, the JRCC made contact with the Coast Guard and the Transport Agency so that they could work together. The JRCC involved four vessels from the Coast Guard and pilot boat 111 from Landsort with a pilot on board and one search and rescue helicopter in the rescue operation.

Around 30 minutes later, the Transport Agency contacted the JRCC and informed them that Oxelösund was the most appropriate port for KERTU. The Coast Guard then made a new outline decision (BIS 2): *“Emergency pumping is the number one priority to stabilise KERTU. Thereafter, escort to Oxelösund, which is appointed as port of*



*refuge*". The vessel KBV 002 adopted the role of "On-Scene Coordinator" (OSC)<sup>13</sup> at the same time as the JRCC announced that as many of the crew as possible should be evacuated as quickly as possible. At 12:28 p.m, all had been evacuated with the exception of the vessel's master and chief engineer, who, together with some crew from the Coast Guard, remained on board in order to pump out the vessel's cargo hold with the help of external pumping capacity. At 12:50 p.m., it was made known that the water level had risen to about four metres in the cargo hold.

The County Administrative Board of Stockholm and Nynäshamn Municipality were informed of the decision that Oxelösund had been appointed as port of refuge at the same time as the Coast Guard established contact with the salvage coordinator appointed by the shipping company, the County Administrative Board of Södermanland, Oxelösund Municipality and the Port of Oxelösund. The port responded that the vessel was permitted to berth on the condition that there was no risk of her sinking by the quayside. The situation was now judged to be extremely serious, with an imminent risk of the total loss of KERTU.

At 3:28 p.m, after consultation with the Coast Guard, there was no longer considered to be a threat to life and the JRCC concluded the life-saving operation and thus the event transitioned to an environmental protection case under the leadership of the Coast Guard.

#### **1.1.6 Maritime assistance service (MAS)**

The term MAS is used in several ways. Fundamentally, it is a coordinated function of a government authority that, in accordance with international regulations, has to have the capacity to function as support to the master and his vessel in the event of a critical situation. In Sweden, it is primarily the Transport Agency, the Maritime Administration (JRCC) and the Coast Guard that are affected. A person (normally a specifically appointed marine inspector) from the Transport Agency is appointed to be part of the coordinating MAS function. This person is also sometimes designated as the MAS. It can also be the case that the affected authorities talk about having a MAS case. The detailed regulation of the MAS function is covered below, e.g. in section 1.16.3 of the report.

SHK's investigation indicates that there were different perceptions among the people who were involved in the question of whether or not the case was judged to be a MAS case and whether or not any MAS function was established at all.

It is clear that preparations were made to initiate the MAS function, an official at the Transport Agency was appointed to act as MAS, that he appeared at the JRCC in Gothenburg and that interaction occurred in

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<sup>13</sup>Acting as OSC involves taking care of coordination and acting as an extension of the rescue coordinator at the site of the accident.

the manner intended in a MAS case, albeit in more limited form than can be done. Furthermore, it is clear that the official understood that the MAS case was closed at 11:30 p.m. According to the Transport Agency's notes, the agency began preparing a MAS function at around 1:30–2:00 p.m. This included contacting the vessel and the salvage master engaged by the shipping company. The Coast Guard, the salvage company and the Transport Agency collaborated, primarily via the person appointed as MAS, and began pumping out KERTU's cargo hold at the anchorage with the help of external pumps. Around 45 minutes later, the JRCC received a message stating that the Transport Agency would be physically present at the JRCC in three hours. The JRCC also received information indicating that there had been a discussion about whether or not the case would become a MAS case, but that no decision had yet been made. At around 4:15 p.m., it was established, following dialogue between the Coast Guard and the MAS, that the situation was extremely serious. The MAS's perception and message was that the water level in the cargo hold must be reduced substantially and that the vessel was not to be moved. There followed an intensive effort to try to prevent the vessel capsizing and being lost. A larger external pumping capacity was placed in the cargo hold on board KERTU. Four hours later, the situation had been stabilised and the water level in the cargo hold has been reduced from four metres to one metre. On the advice of the MAS, the Coast Guard checked the rolling period so that the MAS would be able to perform stability calculations. Attempts were then made to maintain both the list and the water level that had been achieved with the intention of minimising the risk of capsizing.

At 10:30 p.m., the JRCC received a message from the officer of the watch at the Coast Guard's command centre NE stating that the vessel had been successfully pumped out and that the salvage coordinator engaged by the shipping company was on board KERTU. Towing of the vessel began at 2:40 a.m., with a pilot on board.

At 11:30 p.m., the MAS case was terminated and it was handed over to the Transport Agency's marine inspector on duty with the information that the vessel was expected to arrive in Oxelösund at midday the following day. According to the MAS, the vessel was at this stage to be considered unseaworthy in any condition.

### **1.1.7 Salvage**

The salvage master engaged by the shipping company arrived, together with a representative of the vessel's insurance company, on board KERTU at 10:30 p.m. in order to prepare for the vessel to be towed in to Oxelösund. Around three hours later, a pilot from Oxelösund arrived on board and the tugboats were connected. The anchor was then heaved and the towing of KERTU initiated. The weather provided good visibility and the wind had eased and turned to north-west 7–8 m/s. The coast guard vessel was tied up alongside KERTU in order to stabilise and continually pump her out. Responsibility for the

rescue operation was transferred to the municipal fire and rescue service when the vessel passed into municipal water in the port area. However, the Coast Guard continued to assist KERTU under an agreement with the fire and rescue service as long as there was a need to do so.

### **1.1.8 In port**

Before towing of the vessel began, the Coast Guard arranged several preparatory collaboration meetings with the County Administrative Boards of Stockholm and of Södermanland and with the Port of Oxelösund, the Sörmland Coast Fire and Rescue Service, Oxelösund Municipality, the Ministry of Defence, the vessel's insurance company and the salvage master. These meetings took place in the morning and evening of 29 October 2014 and the morning of 30 October.

KERTU arrived at the Port of Oxelösund at 11:50 a.m. on the day after the grounding, i.e. 30 October. The Coast Guard concluded its environmental protection operation and responsibility for the rescue operation was thus transferred to the municipal fire and rescue service. In consultation with the fire and rescue service, the Port of Oxelösund set out oil containment booms around the vessel as a preventive measure once she was moored.

When the vessel arrived at Oxelösund, the Transport Agency went on board the vessel and conducted a port state control of the berthed vessel. Representatives of the vessel's classification society, the shipping company, the insurance company, SHK, the police and the port also went on board the vessel.

According to its log, the JRCC concluded the case at 7:30 p.m. on 30 October.

The damage resulted in the ship, following temporary reinforcement work at the quay in Oxelösund lasting several weeks, being considered a total loss and she was then towed to a yard in Denmark and was scrapped.

## **1.2 Damage to the vessel**

KERTU suffered severe damage to the bottom of her hull and tank top that included her frame and bottom beams and girders. The side tanks were also damaged. There was bunker oil (diesel) in the ballast tanks, which means that the bulkheads between the ballast tanks and the bunker tanks (diesel) had been opened, probably at both ends. The majority of the pipework in the ballast tanks was damaged. There was damage to at least two cargo hatches. There was major damage to the two movable cargo hold bulkheads. It has been established that there was damage to both port and starboard cargo hold bulkheads, with inward dents in the area around the movable cargo hold bulkheads. Major damage occurred to the four blades of the propeller. At least

three tanks located in the engine room were damaged. The condition of the propeller axle and its sealing is unknown.

### **1.3 Emissions into the environment**

The Coast Guard Air Patrol reported at 5:30 p.m. on 29 October that an estimated 3 m<sup>3</sup> of oil had leaked out.

According to the Coast Guard's calculations following soundings being taken of the tanks on board upon the vessel's arrival at Oxelösund, about 19.5 m<sup>3</sup> of diesel had spilled into the sea.

The shipping company has stated that it is impossible to establish any precise or approximate figure for the quantity of fuel that leaked out. The damage stretched across a large proportion of the bottom of the vessel, with damage to the internal structure between the tanks. Oil and water was mixed in almost all of the tanks. It was impossible to take any soundings of what was left in the tanks and cargo hold. Attempts were made to empty the bunker tanks with a sludge vehicle in Oxelösund, but even here it was impossible to say what quantity of oil that was pumped out.

### **1.4 Site of the accident**

KERTU was a vessel subject to compulsory pilotage on the voyage from Bålsta to Landsort. However, large vessels are permitted to pass east of Landsort without a pilot on board. KERTU was not subject to compulsory pilotage east of Landsort.

Normally, pilots leave and board vessels that are coming from or going to Södertälje/Lake Mälaren on the western side of Landsort and vessels going to or coming from Nynäshamn/ Dalarö fairway south-east of Landsort. However, deviation is made from this depending on the need of vessels to find shelter from shore in heavy weather with high swell in order to allow the pilot to disembark or embark a vessel safely.

In this case, the pilot deemed it necessary for safety reasons to find shelter on the eastern side of Landsort and therefore disembarked at a position inside of the compulsory pilotage limit. The significant wave height was up to three metres in this area at that time, which means that the highest waves were about five metres high.

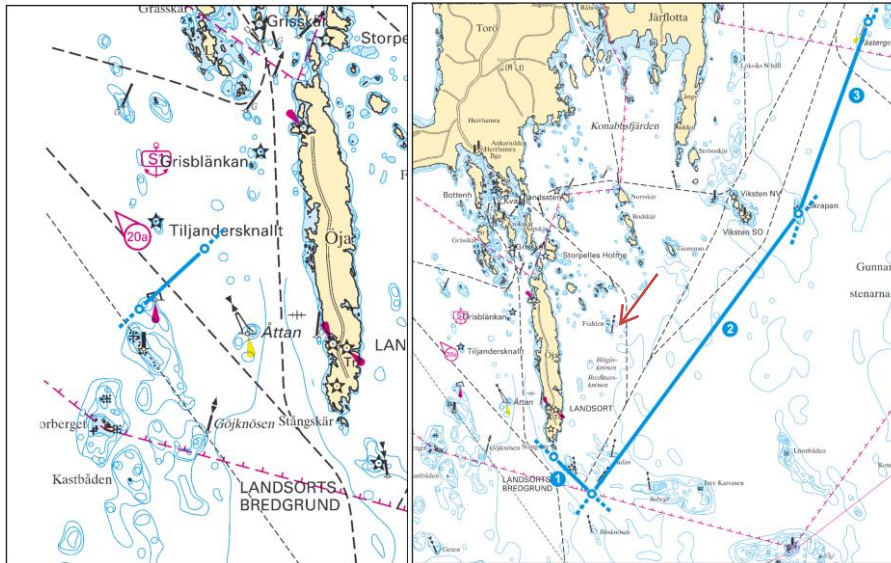


Figure 3. Compulsory pilotage limits to the west and east of Landsort. The arrow shows where the grounding took place.

### 1.4.1 The vessel's chart of the area and her planned route

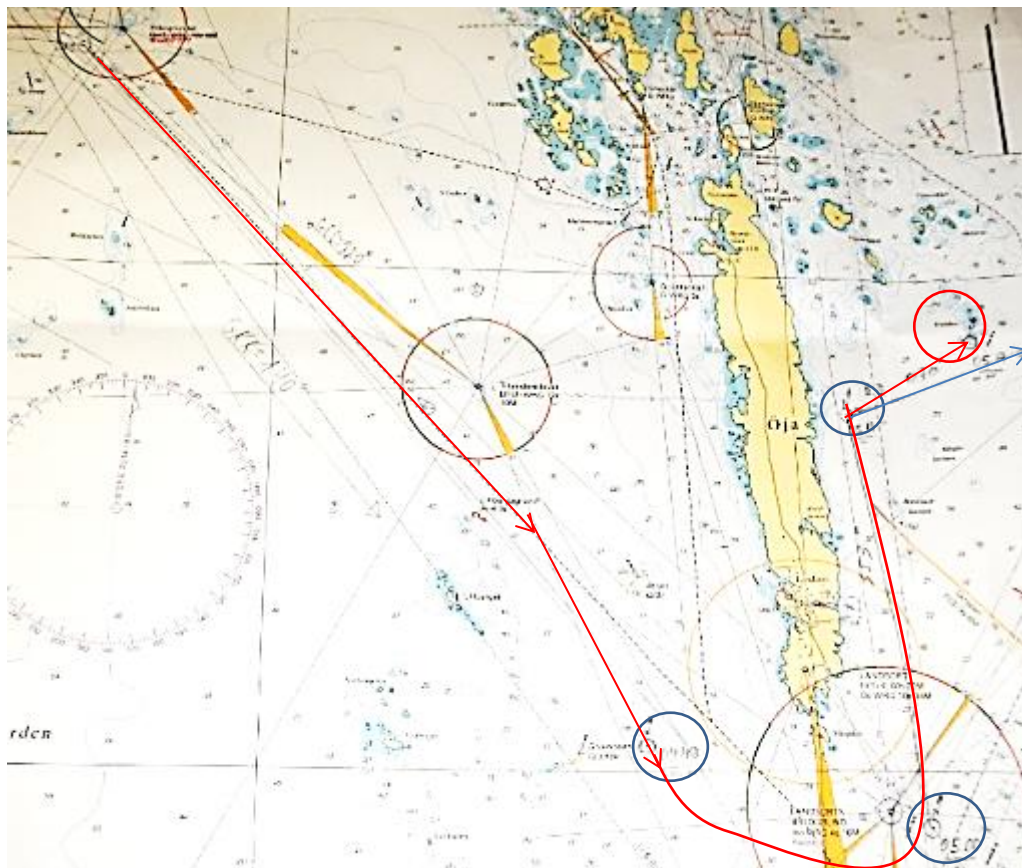


Figure 4. The vessel's chart of the area and her route and planned route. The blue arrow indicates the planned route following the planned disembarkation of the pilot to the east of Landsort. The blue rings show the positions plotted on the chart and the red ring shows where the grounding took place.

When SHK was on board KERTU, the routeplanning and associated correct position information was found drawn on the paper chart. It was established that the course over ground (COG) found in the

routeplanning from the point the pilot left KERTU and onward in an easterly direction was 070°. If KERTU had steered this course over ground, i.e. after correcting for drift in the hard southerly wind, she would, by a small margin, have passed south of “Fudden” and north of Gunnarstenarna and then entered the open sea.

However, a course over ground of 090° from the position at which the pilot left, leads south of Gunnarstenarna and onward out into the open sea.

It is possible to pass both north and south of Gunnarstenarna well outside of the compulsory pilotage limits with a vessel of the size and draught of KERTU.

### **1.5 The government authorities communication with KERTU in the first four hours following the grounding**

The VTS was in VHF contact with KERTU on two occasions in the first four hours following the grounding. Aside from this, no government authority made direct contact with KERTU during this period.

The master initially informed the VTS that he was manoeuvring in order to get afloat. The VTS did not inform the Transport Agency that KERTU was manoeuvring on the ground. The VTS made contact with the JRCC by telephone and in this call, it was mentioned that KERTU was manoeuvring in order to get afloat but not that the grounding had taken place at a speed of almost ten knots. The bad weather was not mentioned either. Having been in contact with the Maritime Administration’s area alert unit and pilotage planning unit, the VTS called KERTU on VHF and the master announced that she was leaking oil. The master then called the Coast Guard by telephone, a call that was connected through to the JRCC, and announced that KERTU was leaking oil.

Aside from the information about the ongoing oil leak, the JRCC did not ask KERTU about her status, despite having concluded in its log that the master sounded nervous and jumpy. The JRCC kept the classification of the case as NIL. The call was then connected through to the Coast Guard’s NE command centre. It is not possible to listen in to what was said during this call as the command centre did not have the means to record telephone calls at the time of the accident.

The Coast Guard vessel KBV 311 circled around KERTU and confirmed there was a smell of diesel and a leak without contacting the vessel. KBV 311 informed their command centre that KERTU was manoeuvring and that she was leaking oil. The command centre contacted the Transport Agency’s marine inspector on duty regarding the oil leak, but did not inform him that KERTU was manoeuvring constantly while aground.

The Maritime Administration did not send out any pilot or pilot boat to the site of the accident and was not asked by the Transport Agency

whether any of the pilots or pilot boats could be sent to the site of the accident while the vessel was aground.

The Transport Agency did not contact KERTU and no MAS function was initiated while the vessel was aground.

The prevailing weather conditions, with a heavy swell and strong wind was neither perceived or questioned about by the JRCC prior to an incoming call from the Marine Police at 8:13 a.m..

The master informed both the VTS and the Coast Guard that the vessel was leaking oil, which these parties then passed on to the Transport Agency, but no incident report was issued from Sweden Traffic<sup>14</sup> (the Maritime Administration) via SafeSeaNet<sup>15</sup>, which the EMSA<sup>16</sup> has subsequently noted and questioned.

The Coast Guard reported the oil leak to HELCOM<sup>17</sup> in conjunction with the accident.

## **1.6 The vessel**

The vessel was a general cargo vessel with a double hull and a cargo hold that could be divided using a movable bulkhead that was not watertight. The cargo hold dimensions were: length 62.48 metres, breadth 11.00 metres, depth 8.44 metres. The vessel's draught at the time was 4.07 metres aft and 2.05 metres fore. The vessel was empty of cargo at the time of the event. The vessel was operated primarily in the North Sea and Baltic Sea.

### **1.6.1 The bridge**

The bridge was equipped with digital charts and two functional centred pieces of radar equipment and two VHF radios that were tuned to channels 11 (internal use within the pilotage area), 68 (maritime traffic information) and 16 (emergency and calling channel). The chart table was, as is usual, located at the aft side of the bridge.

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<sup>14</sup>Sweden Traffic – Incident reporting from Sweden Traffic takes place in partnership with the Coast Guard and the Transport Agency in accordance with an agreement. Reports concerning emissions, POLREP, are initiated by the Coast Guard.

<sup>15</sup>SafeSeaNet – Monitoring of vessels in the EU's territorial waters.

<sup>16</sup>EMSA – European Maritime Safety Agency.

<sup>17</sup>HELCOM – Baltic Marine Environment Protection Commission – Helsinki Commission.



Figure 5. The bridge on board KERTU.

### **1.6.2 Voyage data recorder**

As the vessel's gross tonnage was less than 3,000, there was no requirement to have a VDR and no VDR was installed<sup>18</sup>. Data from the AIS has been gathered by SHK from a land-based unit. These data has also been compared with the recording from the vessel's digital chart and they are consistent.

### **1.6.3 The shipping company's organisation and management**

The shipping company had one company that owned the vessel and another company that was responsible for the vessel's operation and manning; what is known as a management company. Both companies were located and registered in Estonia. The vessel was registered in Malta and carried a Maltese flag.

### **1.6.4 The crew**

The vessel had a crew of nine, including the master and two nautical officers.

#### *The master*

The master had a master mariner's qualification. This was the first time he was in this traffic area, despite having been a master for 15 years. He had been on board for 42 days and, on the night of the accident, had only rested on the sofa for an hour or so. He has stated that, a few days after having joined the vessel, he received some private bad news that had been having an emotional impact on him ever since.

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<sup>18</sup>VDR – voyage data recorder – automatic recording equipment on the bridge.



He has stated that, while passing through the lock in Södertälje, the pilot informed him that he was considering leaving on the eastern side of Landsort because of the bad weather. Once the lock had been passed, the second officer and then the first officer had kept watch on the bridge together with the pilot. The master went down to his cabin and rested on the sofa.

He went up onto the bridge before KERTU rounded Landsort, which was about 15–20 minutes before the pilot was to disembark. He has stated that the pilot talked with the pilot boat, but did not give the master any instructions prior to the approaching disembarkation of the pilot. Nor did he ask the pilot about anything. When it was time to drop off the pilot, the first officer and the able seaman acting as look-out went down with the pilot to the pilot ladder, as is usual, and the master was left alone on the bridge. Shortly after the pilot had got down into the pilot boat, KERTU was called by the pilot boat, which requested on VHF that he should change course to 090°. He asked the first officer to check the position when he came back to the bridge. Shortly after this, the master asked if the heading 070° was correct. The heading 070° was repeated by the first officer, which the master interpreted as indicating that the heading would lead clear of the shallow water.

Shortly after this, the vessel grounded. The first officer and the rest of the crew then checked the damage situation. The master responded to a VTS call and as far as he can recall, responded that they were OK and manoeuvring in order to come off the ground. While aground, telephone contact was made with the shipping company's DPA (Designated Person Ashore, safety manager). He also had a telephone conversation with the Coast Guard, who connected him through to the JRCC, before ending up with the Coast Guard's command centre shortly afterwards, who he informed that the vessel was leaking diesel oil. Aside from this, he was never contacted by anyone else in the four hours the vessel was aground, neither the JRCC nor the Transport Agency.

His plan was to come off the ground as he was afraid that the vessel would otherwise break apart. No one gave him advice to, for example, remain aground. The vessel bumped hard on the ground, but according to the master, the vessel only moved laterally when he engaged the bow thruster.

When the vessel came off the ground, he began to head south towards the anchorage south-west of Landsort. The crew noted water coming into the cargo hold and tried to pump this out, but it was not possible. It was discovered later on that the bilge lines from the cargo hold had been damaged in conjunction with the grounding.

### *Chief officer*

The chief officer was qualified as chief officer on all sizes of vessels and had been at sea for the past 28 years, 15 of which as chief officer on board similar vessels. He came on watch at 4:00 a.m. and called the master 20 minutes before the pilot was due to disembark. Having been down on deck to drop off the pilot, he went back to the bridge again immediately. When he arrived on the bridge, he went directly to the vessel's logbook in order to note the time and position of the pilot's disembarkation. As he was filling in the logbook, the master asked him to take a current position. The chief officer understood this to mean that he was to take the position with the primary purpose of entering this in the logbook together with the time the pilot was dropped off. The master then said "new heading 070°", which the chief officer interpreted as the master wanting to inform him of the new heading he was turning to and not that it was intended as a question as to whether or not this heading was correct.

## **1.7 Meteorological information for the site of the accident according to SMHI's analysis**

The weather from 1:00 a.m. on 29 October to 1:00 p.m. on 30 October local time, Landsort.

Wind:<sup>19</sup> Initially S–SW 10–15 m/s. From 3:00 p.m. (29 October) W–NW 5–9 m/s.

Visibility: On the morning of 29 October, 8–10 km, otherwise >10 km.

Weather: On the morning of 29 October, light rain.

Air temperature: 7–11 degrees Celsius.

Significant wave height:<sup>20</sup> Initially 2.5–3 m, from 9:00 a.m. 2–2.5 m, from 1:00 p.m. 1–2 m, from 6:00 p.m. 0.5–1 m (up until midday on 30 October).

Current:<sup>21</sup> Initially ENE 0.3–0.4 knots, from 2:00 p.m. direction of current approximately east 0.2 knots, in the afternoon easing further to 0.1–0.15 knots (still east).

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<sup>19</sup>The wind speed is defined as average wind speed over the course of the ten minutes preceding the time of the observation. The direction is the direction from which the wind is blowing.

<sup>20</sup>The wave height is generally given in terms of the significant wave height (SWH), i.e., the mean value in wave height within the top third of the waves. The highest waves are 1.6 to 1.8 times the SWH. Sometimes a few isolated waves can reach double the height.

<sup>21</sup>The direction of current is the heading in which the current flows.

## 1.8 Risk analysis for vessels in Oxelösund

The County Administrative Board of Södermanland's risk and vulnerability analysis has identified collisions involving vessels and oil or chemical spills along the coast or in Lake Mälaren as risks. The analysis was conducted following the accident involving KERTU and this is also referred to in the document.

In its document "Action plan for a safer and more secure municipality", Oxelösund Municipality identifies the Port of Oxelösund as a place where activities occur that are encompassed by the provisions in Chapter 2, Section 4 of the Swedish Civil Protection Act (2003:778), which covers obligations relating to dangerous activities.

It is not primarily maritime traffic, rather the industrial facilities that cause the obligation for the port to maintain readiness in accordance with the Civil Protection Act. In the section that deals with the Sörmland Coast Fire and Rescue Service, it states that there are oil protection sites for Trosa, Nyköping and Oxelösund. The document also contains pictures that show the boundaries of the port areas. The fire and rescue service's own risk analysis mentions the Port of Oxelösund, its heavy industry and the risk of oil spills along the coast as specific risk objects.

The municipalities are to have plans in place for crisis management in accordance with the Swedish Act (2006:544) on municipal and county council measures prior to and during extra-ordinary events in peacetime and during periods of heightened alert. The plans principally encompass events such as acts of terror, climate change, epidemics/pandemics, natural disasters, long-term disruptions to the water, electricity and IT systems.

In Oxelösund Municipality's work with risk and vulnerability analyses, the port is addressed as a risk object, but not as critical infrastructure. Oil spills along the coast is one of the risks identified. In addition, it states that "accidents that encompass SSAB, AGA gas, the port and the transportation of hazardous goods by rail may result in serious consequences for Oxelösund's built-up area as a result of the industries' activities and geographical location".

Otherwise, there are no risk analyses or action plans that cover burning, listing or sinking vessels in the port area in the material that SHK has reviewed. The risk analyses and action plans in other parts of the municipality's and fire and rescue service's areas of responsibility are also somewhat general and not particularly rich in detail.

The Port of Oxelösund has identified a number of vessel-related risks in the port area, for example capsizing, vessels or berthing facilities being run into, collisions or sinking vessels by the quayside or within the port area, but not of vessels with fires on board. The Port of Ox-

elösund had 646 vessel movements<sup>22</sup> in 2014 involving container vessels, ro-ro vessels and tankers.

## 1.9 Pilotage

The Maritime Administration provides pilotage and assistance from pilots for vessels within Swedish territorial waters. The Maritime Administration employs approximately 200 pilots and around 33,000 pilotage operations are conducted each year. Thanks to the pilot's knowledge of the fairway and experience of manoeuvring many types of vessels, they make a contribution to maritime and environmental safety and accessibility can be maintained when vessels travel through Swedish internal waters. Sweden's pilots are experienced master mariners<sup>23</sup> with great knowledge and experience of vessels and are a societal resource that is also at the nation's disposal in the event of vessel accidents and other vessel-related contexts. The qualifications for employment as a pilot are a master's certificate of competency<sup>24</sup> and having served as a senior officer, often with past experience as a master in the merchant fleet. Once employed, pilots undergo internal training in accordance with a set training plan.

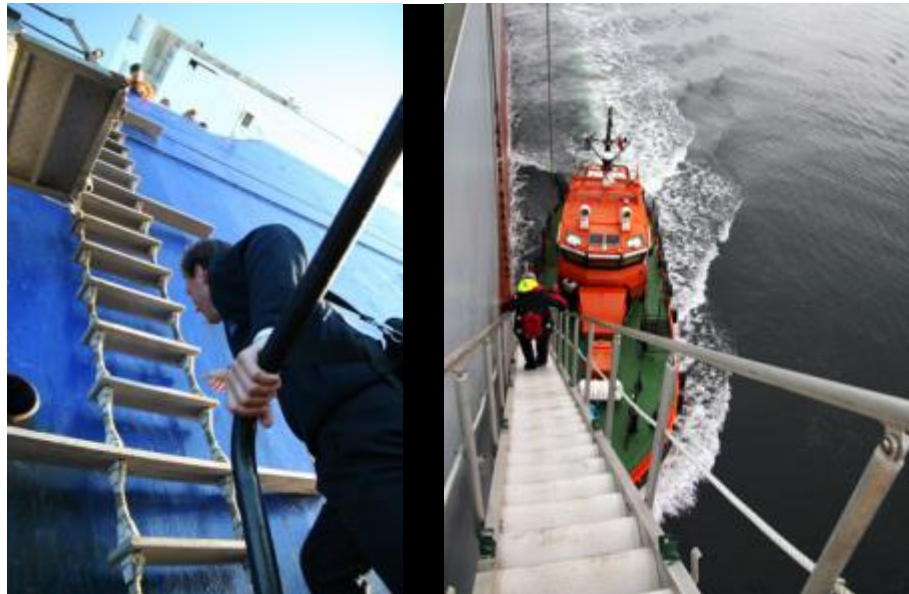


Figure 6. The pilot embarks or disembarks a vessel. Photo: Swedish Maritime Administration.

<sup>22</sup>Source: Ports of Sweden

<sup>23</sup>Degree of Bachelor of Science in Nautical Science worth 180 higher education credits and 75 credits vessel-based training.

<sup>24</sup>Master's certificate of competency – Authorisation for which the applicant must have a Degree of Bachelor of Science in Nautical Science and, having gained authorisation of at least Class V, have served at sea for at least 36 months as an officer on a merchant vessel with a draught of at least 500. At least 18 months of this time must have been completed in local traffic other than between ports in the Öresund or in longer-distance traffic, of which 12 months as at least first officer on a vessel with a gross draught of at least 3,000.

### 1.9.1 *Pilotage of KERTU*

The pilot was experienced in the area and in the post, having been a pilot for over 20 years. During SHK's interview, he has stated that the master on KERTU was not a talkative person, but otherwise appeared to maintain a normal standard of competence, however with not very good English language skills.

When departing from Bålsta, the pilot received no signal from what is known as the pilot plug<sup>25</sup> and therefore was not able to use his own personal pilot's computer during the pilotage. When passing through the lock in Södertälje, the pilot proposed to the master that he would disembark KERTU on the eastern side of Landsort because, given the swell, this was a better location for disembarkation as well as for navigation following the pilot's departure. The pilot has stated that he also indicated the position on the chart and that he informed the master that he should then steer to an easterly heading out into the sea south of Gunnarstenarna. Later in the voyage, out towards Landsort, the pilot also showed the officers on watch where he intended to leave the vessel, east of Landsort. To the pilot's knowledge, no one on board KERTU changed the route in either the electronic chart or in the paper chart and he often looked at the vessel's electronic chart during the voyage.

When KERTU entered the open sea west of Landsort, the swell eased off and, because the master had not come up to the bridge at this point, the pilot asked the officer of the watch to call the master so that he would be on the bridge when they rounded Landsort. When it was time for the pilot to go down to the pilot boat, the master positioned himself by the autopilot and the pilot stated that he was to turn to 045° in order for the vessel to provide shelter from the swell when the pilot was leaving. The master said nothing, he was just silent.

The pilot did not inform the master at this stage of which new heading KERTU was to take after he had left the vessel, as he felt that the master was already in agreement about where he was to disembark. Nor did he show the master what KERTU's current position was in conjunction with his disembarkation.

Shortly after the pilot had come down into the pilot boat, one of the boat men on the pilot boat said "she's not turning". One of the boat men in the pilot boat then called KERTU on VHF and requested that she should turn to an easterly heading. The master responded 060°, which was corrected immediately on VHF from the pilot boat, which once more urged KERTU to turn to heading 090°, to starboard, which was also repeated by KERTU. The pilot boat then set a course north on the eastern side of Landsort towards Ankarudden, where the pilot was to be picked up by a taxi. From the pilot boat, they trusted that KERTU turned as had been said and did not monitor her onward

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<sup>25</sup>The pilot plug – a connector on the bridge that is intended to allow all pilots, anywhere in the world to connect their personal computers containing their planned route and their digital chart.

voyage out from the pilotage area. Nor did they communicate with the VTS about tracking out from the pilotage area.

After the VTS had called the pilot boat and asked “Did she get stuck?”, the pilot called up the VTS and asked if they had raised the alarm. The VTS informed the pilot that they had already called the JRCC, which had been put on a heightened state of alert, according to information from the pilot. Shortly after this, the pilot called up the VTS again and asked if the VTS had called the Transport Agency’s officer on duty. In consultation with a superior within the Maritime Administration, they agreed that the pilot would go home in order to take part in a meeting later that day in Södertälje as a result of the event. Prior to the shift, the pilot was rested and had been off work for over 24 hours, but has stated that he was tired at four o’clock in the morning.

The pilot has presented a proposal to the investigation with respect to the future disembarkation of pilots on the eastern side of Landsort. The proposal involves a vessel being able to turn to port in towards Landsort and that the pilot leave on a southerly heading, after which the vessel would then turn to port towards the east and reach the open sea south of Gunnarstenarna as indicated in the sketch below. This would mean that the vessel is given more space to make its turn out towards the open sea after the pilot has disembarked the vessel, compared with the opposite approach that was used during the event in question. (See the green track in Figure 7, below.)

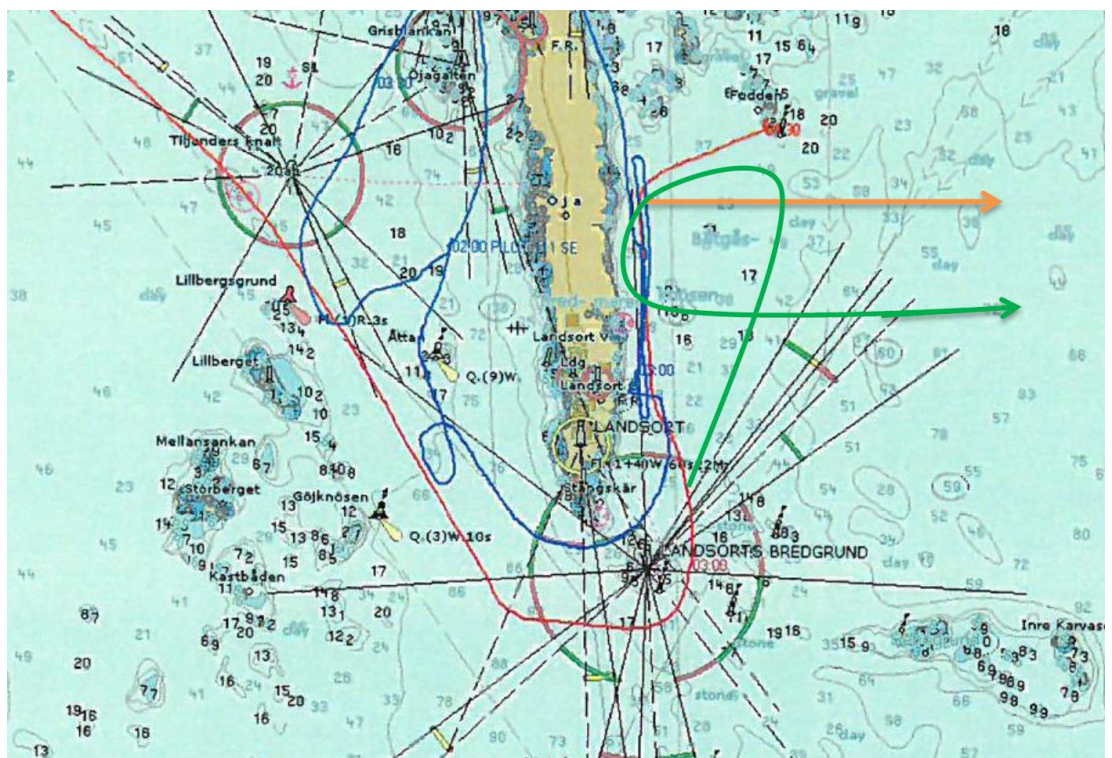


Figure 7. The picture shows KERTU’s track in red. The pilot boat’s track is blue. The change of KERTU’s course following disembarkation recommended by the pilot is marked in orange. The green track shows the route the pilot proposed following the accident for pilot disembarkation in the event of heavy seas with westerly and south-westerly wind.

### 1.9.2 *The pilot boat*

The main role of the pilot boat is to collect and drop off pilots on board vessels. In the event in question, the pilot boat was, as usually when a pilot is to disembark, manned by two boat men, one of whom acted as master. The pilot boat has a central operator's seat, with an arrangement of navigation equipment such as radar, steering, throttle, VHF and digital chart easily accessible to the operator of the pilot boat. A little aft of the operator's seat, there were two chairs and some sofas for others on board. There was no separate navigation equipment on board that was intended specifically for piloting vessels from the pilot boat.



Figure 8. Interior of a similar pilot boat with associated instrumentation and navigational support on the starboard side of the operator's seat.

### 1.9.3 *Disembarkation of the pilot*

In bad weather, it may be necessary for the master, in consultation with the pilot, to provide shelter for the pilot boat when the pilot disembarks the vessel. There are various techniques used to provide the pilot boat with shelter. The most common way is to turn so that the vessel uses its own hull to protect the pilot boat from the swell. Another technique that can be applied in the event of a severe swell is for the vessel to turn sharply and thus smooth out the sea at the same time as the pilot is disembarking. The disembarkation of a pilot is a risky moment and it is therefore important that the pilot, master and crew of the pilot boat work close together.

## 1.10 Vessel traffic service (VTS)

VTS stands for vessel traffic service and this is used as a collective term for maritime traffic information and service for shipping in specific VTS areas within Swedish territorial waters.

The overall objective of VTS is to increase the safety of maritime traffic and reduce the risk of environmental damage. The Maritime Administration has four VTS centres that monitor nine demarcated VTS areas in Swedish territorial waters and one maritime traffic reporting system adopted by the IMO in Öresund.

The site of the accident is within the Landsort VTS area, but is named VTS Södertälje in radio traffic. The VTS area stretches from Södertälje channel, around Landsort and inside the belt of reefs at Mysingen towards Rotholmen, south-east of Gålö.

The VTS centres are manned by VTS operators whose work involve monitoring the VTS area, providing vessels with information about the current traffic situation and other limitations to navigability and other circumstances that may be pertinent to their safe operation. Communication with the VTS centres takes place primarily through VHF radio on specifically designated radio channels for each VTS area. All VTS centres receive information via the Maritime Administration's computer network from vessels' AIS transponders and, when available, which is usually in areas around the pilot boarding points in the outer archipelago, radar as well. This means that vessels' positions and movements are presented in electronic charts on computer screens. The VTS centres have access to current wind and water information from a number of weather stations along the Swedish coast and VTS operators must always keep themselves constantly updated about the traffic situation and any hazards or changes in the fairway.

Eligibility to become a VTS operator requires at least a class VII deck officer qualification<sup>26</sup> and a valid radio qualification, at least ROC<sup>27</sup> and good knowledge of both written and spoken Swedish and English. A Degree of Bachelor of Science in Nautical Science and previous experience as an officer of the watch is of merit. Once employed, internal training is provided in accordance with a set training plan.

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<sup>26</sup>The class VII deck officer qualification is worth 40 higher education credits.

<sup>27</sup>ROC (Restricted Operator Certificate) – a restricted radio operator certificate for maritime mobile traffic in GMDSS.





Figure 9. VTS operator station. Photo: Swedish Maritime Administration.

### ***1.10.1 The VTS operator's actions during the event involving KERTU***

Having been employed at the workplace for 30 years, the VTS operator was experienced in the area and in the role. He had begun his shift about six hours prior to the grounding, but stated during SHK's interview that he was tired at four o'clock in the morning.

The operator began tracking KERTU when the pilot informed him that he intended to disembark on the eastern side of Landsort. The intention was to monitor the vessel out towards Gunnarstenarna after the pilot had disembarked. Shortly after the pilot had left the vessel, he noted that KERTU did not turn to the correct heading as expected, but at almost exactly the same time, he heard the pilot boat's call "turn to 090°", which was repeated by the vessel. He has stated that he then lost concentration on the tracking for a moment in order to get up another chart that would be of assistance to him at a later stage when KERTU was to pass Gunnarstenarna. The reason was that he did not feel comfortable with the ordinary tracking equipment that was available.

A few seconds before the grounding occurred, he noticed KERTU's precarious position and also realised shortly afterwards that she had grounded. He called KERTU, without getting a response and then raised the alarm with the JRCC and other concerned, in accordance with the VTS check-list for events of this type.

The VTS made contact with KERTU 12–13 minutes after the grounding and the VTS operator has stated that he then informed the JRCC that KERTU, according to information from the master, was not leaking oil and not taking in water at this stage. Nothing else pertaining to the grounding happened from then until the end of his shift at 6:00 a.m.. He thought that KERTU or other authorities would make contact if they required assistance. He has stated that he followed normal procedures for groundings, even though this event, in his experience, differed from others because the JRCC and Coast Guard normally make contact in the event of groundings. However, this did not happen during the remainder of his shift.

### 1.11 The Joint Rescue Coordination Centre (JRCC)

The Maritime Administration is responsible for search and rescue operations (SAR) at sea and in air. Sea rescue encompasses search, location and recovery of people who are or are feared to be in distress at sea in the central government area of responsibility. The Maritime Administration's Joint Rescue Coordination Centre's (JRCC) principal role is to receive alarms concerning accidents in the air, on land and at sea that has occurred or are feared and coordinate the resulting operation. There is always a rescue coordinator in charge who assesses the alarm and makes a decision as to whether or not a rescue operation is to be initiated.

The Maritime Administration's helicopters, pilot and fairway boats, the Coast Guard, the Swedish Sea Rescue Society (SSRS) and all other vessels near to the accident area have to participate in a life-saving sea rescue when requested to do so by the JRCC's rescue coordinator. This contributes to increased maritime safety, enables human lives to be saved, limits injuries to people and minimises the consequences for property and the environment. The JRCC is the point of contact for the vessel when a MAS situation arises.

Eligibility for a job as a rescue coordinator requires the applicant to have a nautical background or aviation experience. They may have been, for example, master mariner, an air traffic controller, military flight controller or a pilot. Once employed, internal training is provided in accordance with a set training plan.



Figure 10. SAR helicopter and SSRS unit<sup>28</sup>. Photo: Swedish Maritime Administration.

<sup>28</sup>SSRS – Swedish Sea Rescue Society, which was not involved in this event.

### ***1.11.1 The JRCC's actions during the event involving KERTU***

From the time of the grounding until the shipping company's salvage coordinator arrived on board KERTU, three different rescue coordinators were on duty at the JRCC, all of whom had many years' experience at the JRCC and many years' experience as on-board employees within the maritime industry.

While the vessel was aground, the rescue coordinator relied on oral information about the situation from, primarily, the VTS. In hindsight, however, some of the rescue coordinators have stated that the JRCC should have obtained more information directly from the master.

They were aware that the JRCC has a convening duty in MAS, but there was a collective uncertainty about the role of the MAS function and its procedures, e.g. who is responsible to initiate this function. However, the JRCC calls in the municipal fire and rescue service as a natural support in the event of, for example, fire on board a vessel. In complex events of this type, there are many parallel areas of responsibility such as environmental protection, to prevent emissions into the environment, the vessel's safety and saving lives and property. The rescue coordinators were well aware of their own area of responsibility.

### **1.12 The Swedish Coast Guard**

The Coast Guard has the task of conducting maritime monitoring and rescue operations at sea. Within these areas, the Coast Guard is to have the ability to prevent, withstand and deal with emergencies. The Coast Guard is also tasked with coordinating and issuing civilian maritime information to other government authorities. The Coast Guard is responsible for environmental rescue services at sea and also has to stand ready to assist other government authorities in sea rescues and other types of rescue operation.

When an oil spill occurs at sea or in Sweden's three largest lakes, Vänern, Vättern and Mälaren, the Coast Guard is responsible for dealing with it and cleaning up the oil. Eligibility for employment as a seagoing trainee in the Coast Guard requires the applicant to have completed either the class VII deck officer training course or class VII engineering officer training course. Once employed, internal training is provided in accordance with a set training plan. Among other qualifications, eligibility for employment as a rescue coordinator requires the applicant to have undergone an internal three-week rescue coordinator training programme, personal suitability and many years' experience in a staff role.



Figure 11. The first unit at the site of the accident. Photo: The Swedish Coast Guard.

### ***1.12.1 The Coast Guard's actions during the event involving KERTU***

Initially, when KERTU was still aground, the Coast Guard's plan was for Nynäshamn to be used as the port of refuge once the vessel had come off the ground. Contact with the master on board KERTU took place via telephone, without the ability to record the calls in the command centre. Telephone contact was also made with the Transport Agency's marine inspector on duty on a few occasions over the course of the morning. However, the Coast Guard did not make contact with the VTS, which has been retrospectively identified as a shortcoming.

The Coast Guard has stated that they gave the master an order to weigh anchor and go to Oxelösund when KERTU anchored in the open sea without having contacted the Transport Agency in advance. However, the master did not want to do so, which is why the vessel remained at anchor.

According to the Coast Guard, the Transport Agency had no interest in coming out to the vessel in distress, which the Coast Guard thought was a little strange as this is what normally happens in such events and because it is important to get qualified personnel on board a vessel in distress. The Coast Guard offered the Transport Agency transport out to the anchorage, but this offer was declined.

The Coast Guard has stated that there may be some uncertainty with respect to the roles of the Coast Guard and the Transport Agency and in terms of the use of ports of refuge. There is also uncertainty about the MAS function's role and its procedures, e.g. who initiates this function.

In the prevailing conditions, the Coast Guard's command staff saw their task as being to act as the rescue coordinator for the event. In the afternoon, however, the Coast Guard discovered that the Transport Agency had initiated the MAS function, which subsequently acted as an advisor and controlled the sequence of events in order to avoid the

loss of the vessel until the salvage coordinator had arrived on board KERTU.

The Coast Guard organised five collaboration meetings during the operation. The principal focus of these meetings was to inform land-based units about the current situation. The Coast Guard has stated that its perception is that a continuous and positive collaboration involving the parties concerned took place during the operation.

### **1.13 Municipal fire and rescue service**

When an oil spill reaches land or a spill takes place in waters that are within the municipal area of responsibility, for example in a water-course or in ports, the municipal fire and rescue service is responsible for the emergency response.

The Swedish Civil Contingencies Agency (MSB) provides support to municipalities with the overall land-based coordination of the response to an oil spill.

The county administrative board is the supervisory authority for municipal fire and rescue services.

### **1.14 National oil protection collaboration group**

There is a national collaboration group that works with oil protection along the Swedish coast. This includes representatives of MSB, the Coast Guard, the Transport Agency, the Maritime Administration, the Swedish Association of Local Authorities and Regions (SKL) and the Swedish Agency for Marine and Water Management.

### **1.15 The Swedish Transport Agency**

The Transport Agency's principal role is to take responsibility for regulation, licensing and supervision within the field of transport.

The Transport Agency should work to ensure that the transport policy objectives are achieved. Its operations are to focus specifically on contributing to ensuring the transport system is internationally competitive, environmentally adapted and safe. In accordance with the regulations that apply to each area, the Transport Agency's supervision is to encompass activities including maritime shipping, especially maritime safety, maritime security and port security.

The Transport Agency is the supervisory authority with respect to compliance with legislation including the Act (1980:424) on Prevention of Pollution from Ships and the Ship Safety Act (2003:364). According to Chapter 6, Section 2 of the Act on Prevention of Pollution from Ships, aside from planned inspection, vessels are to be inspected when the supervisory authority deems it necessary. The same applies to supervisory duties pursuant to the Ship Safety Act (Chapter 5, Section 4 of the Ship Safety Act). This means that the Transport

Agency normally sends a marine inspector to the vessel in conjunction with marine casualties of a serious nature.

Eligibility for employment as a marine inspector requires the applicant to have a chief engineer<sup>29</sup> or master mariner or an engineering degree<sup>30</sup> within the field of naval architecture. Once employed, internal training is provided in accordance with a set training plan.

#### ***1.15.1 The Transport Agency's actions during the event involving KERTU***

SHK has conducted a large number of interviews with people from both senior management and various operational positions within the Transport Agency's Civil Aviation and Maritime Department.

The JRCC initially called to inform the Transport Agency's officer on duty<sup>31</sup> about the accident at 4:45 a.m.. Shortly thereafter, the officer on duty handed over the case to the marine inspector on duty in the Stockholm area, where the accident had occurred, who began taking action over the next few hours. After a few hours, this person handed over the case to a colleague as he was booked to undertake another task. While this colleague, who had now been given the role of marine inspector on duty with respect to KERTU, was involved in familiarising themselves with what had happened, the Coast Guard called and informed them that the vessel had come off the ground.

The marine inspector on duty has stated that it was clear to him at an early stage that this was not a "normal" grounding, rather this was a vessel that had run aground in bad weather, come off the ground and was taking in water and it was therefore a high-risk situation for both the crew and the vessel. For these reasons, he pointed out to the Transport Agency's head office that the MAS function should be activated. However, he felt that he met with a certain degree of incomprehension from senior management over the course of the morning.

It has come up in several of the interviews that the decision to initiate the MAS was preceded by discussions, primarily between senior management and maritime operations staff in both Stockholm and Norrköping. The MAS function was initiated almost ten hours after the accident had occurred. At this point, the person who was tasked with acting as the MAS was at his workplace in Norrköping and set out for the JRCC in Gothenburg. While travelling there he was in contact with a number of the parties involved. Once he arrived in Gothenburg, he acted as MAS until the case was concluded at 11:30 p.m., when the shipping company's salvage coordinator arrived on board and the situation was deemed to be under control. At this

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<sup>29</sup>Degree of chief engineer is worth 180 higher education credits and 75 credits vessel-based training.

<sup>30</sup>Degree of Master of Science in Engineering - naval architecture is worth 300 higher education credits.

<sup>31</sup>The officer on duty function and on-call member of staff in the event of a marine casualty is the same person, i.e. an expert in shipping who can be reached via two different telephone numbers. The Transport Agency's emergency number in the event of marine casualties is displayed on the agency's website.

point, the Transport Agency deemed that KERTU was to be regarded as unseaworthy.

Retrospectively, the Transport Agency's senior management has stated to SHK that a formal MAS function was not established at all as the Transport Agency made the assessment that the situation was a borderline case and the development was logged.

During the investigation, the senior management of the Civil Aviation and Maritime Department have stated that they have three designated people who are able to act in the MAS function and who are experienced and have appropriate expertise for this role. Two of these are located in Norrköping and one in Gothenburg.

The majority of the people from the Transport Agency who were interviewed have not been able to describe to SHK how the MAS function is supposed to work, nor did they know when it has to be or should be activated.

## **1.16 Maritime rescue operations**

### ***1.16.1 Provisions concerning fire and rescue services***

#### *Responsibility for fire and rescue services*

Provisions concerning fire and rescue services are found primarily in the Civil Protection Act (2003:778) and the Civil Protection Ordinance (2003:789). According to Chapter 1, Section 2, first paragraph of the Civil Protection Act, fire and rescue services denotes those rescue operations that central government or the municipalities are to be responsible for in the event of accidents and the imminent threat of accidents that aim to prevent and limit harm to human beings and damage to property and the environment.

The central government is responsible for mountain rescue services (Swedish Police Authority), air rescue services (Maritime Administration), sea rescue services (Maritime Administration), environmental rescue services at sea (Coast Guard), rescue services in the event of emissions of radioactive substances (county administrative board) and searching for missing persons in some cases (Police Authority).

In accordance with Chapter 3, Section 7 of the Civil Protection Act, each municipality is responsible for other fire and rescue services within the municipality. This means that when a vessel in distress is within or arrives in municipal waters, responsibility for the rescue operation is transferred to the municipal fire and rescue service, with the head of the fire and rescue service or someone appointed by them being the rescue coordinator.

The central government's responsibility for sea rescue services<sup>32</sup> and environmental rescue services at sea also encompasses the lakes Vänern, Vättern and Mälaren, but not other inland lakes, watercourses, channels or ports (Chapter 4, Sections 3 and 5 of the Civil Protection Act).

It can be noted here that Sweden has the longest coastline in the EU and there are over 50 commercial ports and a number of industrial ports that also fall within the municipal fire and rescue services' area of responsibility. The turnover of goods in these ports is about 130 million tonnes per year and the number of passengers that travel via these ports is about 28 million per year. Ninety-five per cent of Sweden's international trade in goods is transported via a port.<sup>33</sup>

#### *Rescue coordinator*

A rescue operation is led by a rescue coordinator. With regard to central government rescue services, the rescue coordinator is appointed by the authority responsible for that rescue service (Chapter 4, Section 9 of the Civil Protection Act).

In terms of municipal fire and rescue services, the head of the fire and rescue service is the rescue coordinator. Normally, others within the organisation who meet the eligibility requirements to be a rescue coordinator, as stipulated by the Government or MSB (Chapter 3, Section 16, second paragraph of the Civil Protection Act and Chapter 3, Section 9 of the Civil Protection Ordinance), are also appointed.

A rescue coordinator has far-reaching powers to encroach on others' rights in the event of a rescue operation. Chapter 5, Section 2 of the Civil Protection Act states that the rescue coordinator, if a threat to life, health or property or to damage to the environment in the event of a rescue operation cannot be better prevented in any other way, the rescue coordinator may afford themselves and other participating staff access to others' property, cordon off or evacuate areas, use, remove or destroy property and make other encroachments on others' rights to the extent the encroachment is defensible with respect to the nature of the threat, the harm caused by the encroachment and other circumstances.

#### *Obligation to contribute to rescue operations*

In accordance with Chapter 6, Section 7 of the Civil Protection Act, a central government authority or a municipality is obliged to contribute staff and property to a rescue operation at the request of the rescue coordinator. This applies if the authority or municipality has appropriate resources and participation does not seriously hinder its normal operations.

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<sup>32</sup>The sea rescue service controlled from the Maritime Administration's Joint Rescue Coordination Centre (JRCC).

<sup>33</sup>Source: Ports of Sweden



In accordance with Chapter 6, Section 8 of the Civil Protection Act, central government authorities, municipalities and individuals have to provide information about staff and property that may be used in a rescue operation when requested by an authority that is responsible for the rescue operation.

#### *Obligation to contribute to sea rescue operations*

In accordance with Chapter 6, Section 6 of the Swedish Maritime Code (1994:1009), if a vessel is in distress at sea, the master is obliged to do everything in their power in order to save those on board and protect the vessel and cargo. As long as there is a reasonable chance that the vessel can be saved, the master may not abandon it unless his or her life is in serious danger.

If the master comes across someone else in distress at sea, he or she is obliged to provide all possible and necessary assistance in order to save those in distress, if this can take place without a serious threat to their own vessel or those on board. If the master otherwise become aware of someone being in distress at sea or become aware of some threat to maritime traffic, he or she is obliged, under the conditions just stated, to take action to save those in distress or avert the danger in accordance with the regulations the Government has issued for such cases.

#### **1.16.2 Prohibitions and injunctions concerning vessels**

A vessel that does not meet the applicable requirements or that has emitted environmentally hazardous substances or is at risk of doing so in the future may be subjected to enforcement action. The Act (1980:424) on Prevention of Pollution from Ships (*Swe: LÅFF*), contains a number of provisions that regulate the opportunity to prohibit a vessel from, for example, continuing her voyage, using certain equipment or similar. In addition, the vessel can be injunctioned to follow a certain route or call at a certain port.

Such prohibitions and injunctions as are specified in Chapter 7, Section 5 of LÅFF are thus based on a vessel having released harmful substances or being at risk of doing so, and they are issued by the Transport Agency. Pursuant to Chapter 7, Section 3 of the Ordinance (1980:789) on Prevention of Pollution from Ships, the Coast Guard may issue such prohibitions and injunctions, provided the Transport Agency's decision cannot be awaited with consideration for the fact that prompt action needs to be taken in order to prevent, limit or combat pollution.

It has been reported above that a rescue coordinator has far-reaching powers pursuant to Chapter 6, Section 2 of the Civil Protection Act (2003:778) to encroach on others' rights. The same legal text also states that such prohibitions or injunctions as specified in

Chapter 7, Section 5 of LÅFF may only be issued by the rescue coordinator if the Transport Agency's decision cannot be awaited.

In the preparatory works to the Civil Protection Act<sup>34</sup>, the Government has stated that if a rescue operation is to be meaningful in emergency situations, the rescue coordinator must have the opportunity to take the action necessary in order to prevent or limit damage. This of course applies to damage resulting from spillages of oil or other hazardous substances into the water. In light of this, the Government was of the opinion that the rescue coordinator should have the power to issue prohibitions and injunctions in accordance with Chapter 7, Section 5 of LÅFF, provided the Transport Agency's decision cannot be awaited.

### **1.16.3 Maritime assistance service (MAS)**

A vessel can end up in a situation in which it requires assistance from land in order to, for example, avoid the threat of an emergency situation or a marine casualty occurring.

The United Nations International Maritime Organization (IMO) has adopted a resolution<sup>35</sup> that recommends member states to establish a maritime assistance service (MAS). The purpose of this type of function is to be a point of contact between a vessel, that while not in distress at sea is in need of assistance, and various authorities concerned and to monitor and track the vessel's situation.

The EU Vessel Traffic Monitoring Directive<sup>36</sup> is an EU directive that contains regulations about vessel traffic monitoring. The directive also contains regulations stipulating that member states have to appoint one or more competent authorities that are to have expert knowledge and the authority to make decisions concerning the reception of ships in need of assistance. Ships in need of assistance are defined in the directive as ships that are in a situation that could give rise to its loss or an environmental or navigational hazard. However, this is not a question of an emergency situation in which life-saving action is required. In such cases, the search and rescue regulations should be applied.

The Vessel Traffic Monitoring Directive also states that member states are to draw up plans for the reception of ships in need of assistance and that such plans are to contain information about which authority is competent to assess the situation and make a decision on acceptance or refusal of a ship in need of assistance in the place of refuge selected. The plans are to be drawn up on the basis of the IMO

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<sup>34</sup>Government bill 1985/86:170 on a rescue services act, etc., p. 88.

<sup>35</sup>IMO Resolution A.950(23) Maritime Assistance Services (MAS).

<sup>36</sup>Directive 2002/59/EC of the European Parliament and of the Council establishing a Community vessel traffic monitoring and information system.

resolutions on maritime assistance services and places of refuge (ports of refuge).<sup>37</sup>

The Vessel Traffic Monitoring Directive has been implemented in Sweden through means including the decision-making powers given to the Transport Agency pursuant to the Act (1980:424) on Prevention of Pollution from Ships (LÅFF). Nevertheless, neither the term ‘maritime assistance service’, nor any Swedish translation of this appears in Swedish legislation. Sweden has informed the IMO that the Maritime Administration’s Joint Rescue Coordination Centre (JRCC) is the Swedish authority that is the point of contact for the MAS. However, there is no legislation with this content. Furthermore, Sweden has informed the European Commission that the JRCC is the point of contact for the MAS, that the Transport Agency is responsible for the MAS coordination and that the Coast Guard is included in the MAS as participating authority. This is not explicitly stated in any legislation either. However, Chapter 6, Section 1 c of the Sea Safety Ordinance (2003:438) states that the obligation to draw up plans for the reception of ships in need of assistance pursuant to Article 20 a of the Vessel Traffic Monitoring Directive is to be fulfilled by the Transport Agency following agreement with the Maritime Administration and the Coast Guard.

The Transport Agency states on its website that the Transport Agency has principal responsibility for the MAS, that the Coast Guard is responsible for environment rescue at sea and that the JRCC is the point of contact between ships in need of assistance and the authorities concerned.

The JRCC is located in Gothenburg and is located in the same premises as the Coast Guard. According to the information gathered by SHK, the intention when the MAS function is activated is that a marine inspector on duty from the Transport Agency will be able to be at the JRCC in Gothenburg in order to assist a ship in need of assistance from there and simultaneously work together with the Coast Guard, the JRCC and any other authorities concerned.

### **1.17 Port of refuge**

A vessel that has been involved in a marine casualty may need to seek a port quickly. In some situations, authorities may also require that this take place. There are provisions in the Vessel Traffic Monitoring Directive concerning ports or places of refuge.

In accordance with Article 20 of the Vessel Traffic Monitoring Directive, member states have to appoint one or more competent authorities that are to have expert knowledge and the authority to make decisions concerning the reception of ships in need of assistance. The authorities appointed shall have the ability to take certain

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<sup>37</sup>IMO Resolution A.950(23) Maritime Assistance Services (MAS) and IMO Resolution A.949(23) Guidelines on Places of Refuge for Ships in Need of Assistance.

actions including ordering the master to go to a place of refuge in the event of an impending threat.

Article 20 a of the same directive states that member states are obliged to draw up plans for how a ship in distress is to be received. The plans are to contain necessary arrangements and procedures and also take into account operational and environmental limitations so that a ship in distress may immediately be brought to a place of refuge. Member states are also to take into account the IMO's recommendations concerning ports of refuge and MAS (maritime assistance services).<sup>38</sup>

The directive does not contain any binding provisions concerning compensation for those who provide a port of refuge. However, the preamble to the directive (para. 16) states that ports accommodating a ship in distress should be able to rely on prompt compensation for any costs and damages involved in this operation.

The Commission has requested that member states shall appoint a number of specific places that will constitute places of refuge or ports of refuge. Sweden and a number of other member states have chosen another approach and have recommended that places of refuge be appointed in each individual case in order to take into account the specific circumstances such as the weather conditions and the vessel's size and cargo. A plan concerning possible Swedish places of refuge was submitted to the Commission in 2014.

The parts of the Vessel Traffic Monitoring Directive that are currently applicable have been implemented in Swedish law through the Civil Protection Act (2003:778) and the Act (1980:424) on Prevention of Pollution from Ships (LÅFF).

In accordance with Chapter 7, Section 5 of LÅFF, a ship can be ordered to seek a certain port. However, one condition is that oil or other hazardous substances has been released by the ship or that there is good reason to fear that this will take place and there are grounds to presume that, for example, Swedish territory or other Swedish interests may be harmed to an appreciable extent. Decisions pursuant to the aforementioned paragraph are made by the Transport Agency. They may also be made by the Coast Guard if the Transport Agency's decision cannot be awaited.

Pursuant to Chapter 6, Section 3 of the Civil Protection Act, a rescue coordinator may make decisions to encroach on others' rights under certain circumstances. However, this paragraph also states that prohibitions or orders pursuant to Chapter 7, Section 5 of LÅFF may only be issued with support of the Civil Protection Act if the Transport Agency's decision cannot be awaited.

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<sup>38</sup>IMO Resolution A.949(23) Guidelines on Places of Refuge for Ships in Need of Assistance and IMO Resolution A.950(23) Maritime Assistance Services.

The legal position with regard to the use of ports of refuge has, to some extent, been regarded as unclear; for example, please refer to the Coast Guard and Maritime Administration's report regarding the need for changes with respect to the reception of ships in distress.<sup>39</sup>

SHK presents in Section 2.11, below, its assessment of the legal situation.

### ***1.17.1 Right to compensation for port owners***

Providing the port to a ship in distress carries some risks for the port's owner. One of the biggest risks is that the ship will lie in the port for a long time and prevent some of the operations that it would otherwise have been possible to undertake. From the perspective of the port's owner, it is therefore essential that there are provisions concerning compensation for the damage that may arise.

Initially, it can be established that there are certain provisions concerning municipalities' right to compensation from central government. If a municipal rescue operation has resulted in substantial costs, the municipality has a right, pursuant to Chapter 7, Section 3 of the Civil Protection Act, to compensation from central government for that part of those costs that is above a predefined level. Furthermore, Chapter 7, Sections 6 and 7 of the Civil Protection Act contain provisions on compensation for individuals for damage to equipment that is caused by a rescue operation.

If a port owner suffers as a result of oil or other hazardous substances leaking from a ship, there are specific provisions concerning compensation for oil damage in Chapter 10 of the Maritime Code.

In the event that a port owner suffers from other property damage, there are no other provisions concerning compensation in the Civil Protection Act. Nevertheless, the Tort Liability Act (1972:207) may be applicable. In principle, this requires those responsible for the damage to have been negligent in order to be liable to pay compensation. However, if a burning ship, citing distress, is sailed into port and the fire spreads to a terminal building, it is not necessarily the case that the damage to the terminal building can be said to have been caused by negligence. If the port owner suffers losses because the operations in the port cannot be undertaken as intended as a result of a ship in distress being sailed into the port and thus taking up space that would otherwise have been used for commercial operations, the damage is to be regarded as a purely financial loss. Obtaining compensation for such losses with support of the Tort Liability Act normally requires the loss to have been caused by criminal action, which in those cases specified here would not be pertinent.

Issues concerning port of refuge and port owners' right to compensation have been brought up on a number of occasions, including in

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<sup>39</sup>Swedish Ministry of Enterprise and Innovation ref. no. N2004/4124/TP.

2004 when STENA NAUTICA was sailed to Varberg, in 2010 when MONSUNEN was sailed to Wallhamn and in 2012 when TRANS AGILA was sailed to Kalmar. Ports of Sweden have brought up these issues with both the Transport Agency and the Ministry of Enterprise and Innovation and they have also been debated in the Swedish parliament.

Internationally, there is a much discussed example from 2012 in which a fire broke out on board a German-flagged container vessel in the Atlantic and the ship was towed towards the area of England–France. After the shipping company has negotiated with various European countries and ports for more than four weeks, Germany eventually took responsibility for guaranteeing the vessel a port of refuge. The ship arrived at Wilhelmshaven eight weeks after the fire had broken out, the whole time having been towed by three tugs. The German Federal Bureau of Maritime Casualty Investigation<sup>40</sup> investigated the event and has published the results in its report 255/12.

## **1.18 Regulations and procedures for pilotage**

### **1.18.1 Compulsory pilotage limits at Landsort**

Chapter 1, Section 4 of the Transport Agency’s regulations and general advice (TSFS 2012:38) on pilotage states that in a pilotage fairway, compulsory pilotage comes into force or terminates when a vessel passes a compulsory pilotage limit. The compulsory pilotage limits are not printed on Swedish nautical charts. Nor is there any specific national or international symbol denoting compulsory pilotage limits. However, the coordinates for the compulsory pilotage limits do appear in an appendix to the aforementioned regulations and they are marked on chart excerpts covering the various pilotage fairways that are available on the Transport Agency’s Swedish language website. These are, however, not available on the Transport Agency’s English language website.

The compulsory pilotage limits for the area in question are available on the Maritime Administration’s website under “passage plan”, drawn out for the area in question under the heading “alternative disembarking”, but without any other explanatory text.

### **1.18.2 Pilotage**

Chapter 4, Section 3 of the Transport Agency’s regulations and general advice (TSFS 2012:38) on pilotage states that if a pilot is prevented from safely embarking a vessel due to, for example, bad weather or the prevailing ice conditions, the vessel may, if the Maritime Administration deems it possible, be guided by the pilot from a pilot boat or in another suitable manner.

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<sup>40</sup>Bundesstelle für Seeunfalluntersuchungsbund (BSU).

Similarly, in accordance with Chapter 4, Section 4 of these regulations, if a pilot is prevented from disembarking a vessel in a safe manner due to, for example, bad weather or the prevailing ice conditions, the Maritime Administration can, in exceptional cases permit a disembarkation point that is inside the compulsory pilotage limit. Following the pilots disembarkation, the vessel, if the Maritime Administration deems it possible, is guided in its onward voyage by the pilot from a pilot boat or in another suitable manner. With the support of this type of guidance, the master may decide to sail the vessel from such a disembarkation point to the pilotage fairway's compulsory pilotage line. If the instructions from the alternative disembarkation point are the result of the prevailing ice conditions, the vessel may be guided in the pilotage fairway by a state-owned icebreaker.

In accordance with Section 32 of the Maritime Administration's regulations (SJÖFS 2014:9) on provision of pilots, ordering of pilots, assignment of pilots and pilot fees, there is also the opportunity to depart in this manner from the primary rule that the compulsory pilotage line determines where pilotage is to take place.

### **1.18.3 *Pilot on board a vessel in distress***

Pursuant to Chapter 2, Section 15 of the Transport Agency's regulations and general advice (TSFS 2012:38) on pilotage, in addition to the master's obligation to engage a pilot in accordance with Sections 1–8 of the aforementioned regulations, it is also the case that the Transport Agency can, in specific cases, decide that the master is obliged to engage one or two pilots if this is deemed necessary with respect to maritime safety or environmental protection. Such a decision may also mean that the holder of a fairway-specific pilotage exemption or a general pilotage exemption becomes obliged to engage a pilot.

#### *The Maritime Administration's internal procedures in the event of a marine casualty without a pilot on board*

In the event of a marine casualty or an incident involving a vessel without a pilot on board, the VTS operator is to establish contact with certain parties in accordance with internal check-lists and inform the head of the VTS area, the head of the pilotage area and the on-call marine inspector at the Transport Agency.

In the event of a marine casualty involving a tanker or other vessel with a reporting obligation (vessels with a gross tonnage over 300 or with a length in excess of 45 metres), the pilot operator is to send a pilot to the site of the accident to assess the situation as soon as possible. At the time of the event, there was no procedure on the VTS check-list to check that the pilot operator had sent a pilot to the site.

*The Transport Agency's internal procedures in the event of a marine casualty without a pilot on board*

According to internal procedures, the marine inspector on duty decides whether there is an obligation to engage a pilot. The marine inspector on duty has to ensure that there is a pilot on board a grounded vessel before it is pulled free. Appointment of the pilot is, however, only to take place after contact has been made with the head of the pilotage area. A pilot may never be appointed if there is a risk to the pilot's personal safety. When contact has been established between the pilot and the marine inspector on duty, the marine inspector on duty becomes the coordinator in accordance with the Transport Agency's procedures. Any decision to terminate a pilotage operation on a vessel in distress is also made by the marine inspector on duty.

#### **1.18.4 VTS regulations and procedures**

*Applicable regulations*

According to Section 2, point 13 of the Ordinance (2007:1161) with instructions for the Swedish Maritime Administration, one of the Maritime Administration's principal duties is to provide a vessel traffic service (VTS). Vessels sailing in the VTS area concerned are supplied with vessel traffic information by VTS Landsort via VHF radio. VTS Landsort used VHF channel 68 as the working channel in this traffic area.

The Transport Agency's regulations and general advice (TSFS 2009:56) on vessel traffic services and vessel traffic reporting systems applicable at the time describe how vessels are to work together with VTS Landsort (which is organisationally part of VTS East Coast). Section 6 of these regulations state that when required for safety reasons, a certain vessel can be given warnings and advice of significance to its operation by the VTS.

The current VTS regulations are primarily targeted at vessels that are users of the VTS service. The Transport Agency states itself that it has no authority to stipulate in more detail how the Maritime Administration's VTS operations are to be conducted. The Maritime Administration's operational VTS procedures indicate that the VTS operator must use all available means in order to prevent a suspected future grounding, collision or other hazard and, in the event of doubt, is to regard the suspected situation as a future certainty and act accordingly.



*Division of responsibility between competent authority and the operational VTS authority*

The international requirements for VTS in accordance with SOLAS<sup>41</sup> Chapter V, Regulation 12 and IMO Resolution A.857(20) mean that there has to be a clear division of responsibility between the competent authority (the Transport Agency) and the operational VTS authority (the Maritime Administration).

**1.18.5 *The Transport Agency's procedures for reporting of incidents and accidents at sea***

The Transport Agency's procedural description for the emergency response in the event of incidents and accidents at sea states that the officer on duty initially has a coordinating role and is to assess the nature of the accident and subsequently adhere to the set procedures. In the event of environmental damage or when there is a high risk of environmental damage occurring, such as in the event involving KERTU, the officer on duty is to inform the head of the Unit for Operators, Vessels and Aircraft within the Civil Aviation and Maritime Department, SHK and the relevant section for maritime supervision (which for KERTU was the section in Stockholm), which is to inform the marine inspector on duty when necessary.

*The marine inspector on duty*

The marine inspector on duty is to act in a supporting role and as a sounding board when the master wants advice or has difficulty making decisions. Examples of this can be when they are having doubts about requesting help in the form of tugboats or other forms of assistance. The procedural description contains a section about how the marine inspector on duty is to act, at and on their way to the site of the accident.

The procedural description includes the following with respect to the protection of property and the environment:

“The master is to take what action they can in order to prevent the vessel from sinking or releasing substances that are hazardous to the environment. If the master does not take such action, [the marine inspector on duty] is to consider stipulating the action that they are to take. The officer on duty, CSLo<sup>42</sup> or CSL<sup>43</sup> is to be contacted prior to such a decision. If the master does not comply with the decision, [the marine inspector on duty] is to consider whether action is to be taken by the Transport Agency. If such a decision is made, it must be sanctioned in advance by CSL or CSLo. If a discussion with the representative of the environment rescue services arises in which

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<sup>41</sup>SOLAS (International Convention for the Safety of Life at Sea) – the international convention that regulates a large number of shipping matters, primarily with respect to maritime safety.

<sup>42</sup>CSLo – head of the Unit for Operators, Vessels and Aircraft within the Civil Aviation and Maritime Department.

<sup>43</sup>CSL – head of the Civil Aviation and Maritime Department.

there is a difference of opinion with respect to the most expedient action, [the marine inspector on duty] is authorised to decide what is to be done on board and with the vessel. [The marine inspector on duty] is not to deal with the question of the way in which the environmental rescue services operate outside of the vessel.”

*The marine inspector on duty course of action at the site of a grounding*

According to the procedural description, the marine inspector on duty is to do the following in the event of grounding:

- “Check the extent of the damage. Do not begin towing the vessel free before the subsequent management of the vessel has been planned with respect to the sea state, water depth, other vessels, etc.
- Wait for a pilot to come on board before towing the vessel free.
- Demand/perform careful stability calculations before any action is taken.
- Remember to always secure the vessel’s centre of gravity against sudden changes resulting from free surfaces or “wet cargo”.
- The above is to be investigated before repositioning cargo or counterbalancing using ballast.”

*Maritime assistance service (MAS)*

The procedural description also describes what applies for the MAS. This states that in Sweden the JRCC is responsible for the MAS function and is the point of contact between the vessel and the authorities on land. The Transport Agency’s Civil Aviation and Maritime Department and the Coast Guard are responsible for the coordination of MAS, which takes place physically at the JRCC, where there is a specific staff office for this purpose. The JRCC convenes the authorities concerned when the JRCC, the Transport Agency’s Civil Aviation and Maritime Director or head of the Unit for Operators, Vessels and Aircraft, or the Coast Guard believes there is a need for MAS coordination. There are certain members of staff at the Transport Agency who have been designated responsibility for MAS coordination and these individuals are then to make contact with the section for maritime supervision in the area in which the accident has occurred and inform the Civil Aviation and Maritime Director. Compulsory measures pursuant to LÅFF must be preceded by a decision of the Civil Aviation and Maritime Director.

### 1.18.6 *Search and rescue (JRCC)*

#### *Instructions for rescue coordinators at the JRCC*

As mentioned previously, the Maritime Administration is responsible for search and rescue in Sweden. The JRCC's principal role is to receive alarms concerning accidents that have occurred or are feared and coordinate the resulting operation. There is always a rescue coordinator in charge who assesses the alarm and makes a decision as to whether or not a rescue operation is to be initiated.

Extensive fact-finding is required in order to enable the rescue coordinator to assess the severity of the situation, confirm its classification and make a decision on what subsequent action is to be taken. The JRCC's internal instructions state the following:

- “Always strive to collect information at its source.
- Treat all those calling in with the utmost seriousness.
- Endeavour to obtain continual confirmation and to complement the information obtained by finding additional sources.
- All information received must be documented.
- Refer to the support templates for each case type for a detailed alarm interview.”

In addition, the instructions in the operational handbook state that it is important to separate assumptions from facts. An assessment made of the assumptions is to be constantly evaluated and a new assessment made when required.

The information-gathering is to result in an assessment and classification of the event and an outline decision (BIS) that describes how the event is to be managed.

#### *The JRCC's classification of events*

The classification of critical situations is based on the degree of concern over the safety of people or objects that may be at risk. A case that has come in can be classified as four different statuses: uncertainty, alert, distress or NIL.

- “Uncertainty” is used for situations in which the sequence of events needs to be monitored, more information needs to be gathered and where it is not currently necessary to alert the rescue units.
- “Alert” is used when vessels or people have problems and need assistance, but are not in immediate danger. The alert classification is commonly associated with a fear that the situation is serious, but there is no known threat that requires immediate intervention.

- “Distress” is used when vessels or people are, with the highest degree of probability, in distress and in need of immediate assistance.
- “NIL” is used in other cases when the rescue coordinator assesses that the alarm is not credible or that nothing that constitutes a threat to human life has or may have happened.

#### *The JRCC’s preparedness*

At night, there are a total of five rescue coordinators working, four of which are on call with emergency telephones during the night and one who can be called down when required. One sea rescue coordinator is responsible for monitoring channel 16 and incoming distress calls at night. The others who are on call are allocated so that two have air rescue expertise and the other two have search and rescue expertise.

#### *The JRCC’s internal procedures in the event of MAS*

The JRCC is the point of contact for the vessel when a MAS situation arises. This means that the JRCC is in contact with the vessel, the authorities, the shipping company, salvor, etc. When the JRCC receives information about an event that may result in a MAS case, the responsible post holders in the MAS management group are to be informed via the Transport Agency’s officer on duty and the officer of the watch from the Coast Guard’s region south-west. In this context, the JRCC also begins documenting the process in the management system. The MAS can be an individual case or part of a function in a sea rescue or environmental rescue case that has already been started. In a major event, the management group for the MAS can form a staff group in the JRCC’s premises in order to have access to the communications equipment on site and to make it easier to obtain a collective view of the situation. The management groups also decide on a suitable place of refuge for the vessel or if other action can be taken in order to assist the vessel. The JRCC is to monitor how the case develops. A MAS case can transition into a search and rescue case and vice-versa.

#### **1.18.7 *The Coast Guard’s role in the event of environmental rescue operations***

In its rescue service plan from 2008, the Coast Guard describes the management processes and general instructions for use in the event of environmental rescue operations. The instructions for rescue coordinators in the event of environmental operations contain a section about collaboration. However, this section does not cover the Coast Guard’s role in a MAS case or how this function is thought to work in the event of serious marine casualties. This is also the case in the Coast Guard’s new rescue service plan from 2015.

### **1.19 Tiredness when working at night**

The normal circadian rhythm for human beings means that we sleep during the night and are awake during the day. The requirement for sleep normally varies between seven and nine hours, but differs between individuals. A night-time rest shorter than seven hours involves a varying degree of sleep deprivation.

There are two principal physiological processes that affect how alert or awake we are. They are the normal circadian rhythm, i.e. the body's natural rhythm for regulating physiological changes at different times of the day, and the relationship between how much we sleep or are awake.

The body is predisposed to adhere to the natural rhythm of sleeping at night and being awake during the day. Between 2:00 a.m. and 5:00 a.m. the level of tiredness is normally at its greatest. If a person who normally sleeps at this time of the day is instead awake, they will be very tired. To some extent it is possible to switch sleeping and waking hours. Night work, or shift work in particular, is still associated with certain risks. Even if a person can adapt themselves to working at night, the normal circadian rhythm will mean that there are still certain critical times when they are more tired.

Daylight has a positive impact on how alert a person feels and darkness has the opposite effect.

There is a direct association between the time of the day when night-time rest begins and how long it lasts. Night-time rest will generally be shortened if it begins in the period from midnight until 6:00 p.m.. Another influential factor is how long a person has been awake. This association has been explained through the normal circadian rhythm having a major impact on when we wake up, i.e. we want to wake up when there is normally daylight. Being awake for more than 18 hours carries a high risk of reduced alertness.

### **1.20 Previous investigations of similar events**

In previous investigations, SHK has noted circumstances that are also brought to the fore in this investigation.

That pilots who leave inside of the compulsory pilotage limit do not continue piloting the vessel from the pilot boat is one circumstance that was also present in another SHK investigation published previously: STENA JUTLANDICA – TERNVIND, RS 2016:05. There has also been an investigation report, PILOT 116, RS 2015:09, in which the pilot has continued to pilot from the pilot boat at the expense of the pilot boats own navigation as the pilot boat was only equipped with one digital chart and the pilot did not have a separate screen available on their personal equipment.

That the JRCC classified a serious accident at sea as NIL and made no direct contact with the vessel involved was also the case in SHK's investigation STENA JUTLANDICA – TERNVIND, RS 2015:05.

In the report LIVA GRETA, RS 2014:01, the Transport Agency is recommended, in consultation with the Maritime Administration, to work to ensure the introduction of a comprehensive national regulation concerning VTS operations.

In the report STENA DANICA, RS 2010:03, the Maritime Administration is recommended to request from the Government a review of the legislation regulating the area encompassing the VTS's role and powers so that the VTS becomes regulated in law.

In a report concerning a vessel that sank in municipal waters NOSSAN, RS 2015:07, the County Administrative Board of Västra Götaland is recommended to, in its supervision of the Norra Älvsborg Fire and Rescue Service's responsibility pursuant to the Civil Protection Act, follow-up the fire and rescue service's capacity to implement effective rescue operations in the event of shipping accidents within the municipal area of responsibility. Furthermore, this report recommends that the Civil Contingencies Agency review the level of knowledge and expertise and the planning within the municipal fire and rescue services for rescue operations involving shipping and when necessary take action in order to reinforce the capability to conduct rescue operations together with other authorities in the event of shipping accidents.

## **1.21 Actions taken according to the respective authority**

### ***1.21.1 The Swedish Coast Guard***

The Coast Guard arranged a follow-up meeting one month after the event involving KERTU to which all the organisations involved in the event were invited. At this meeting, deficient communication between the Coast Guard and the VTS was identified as a problem, which has resulted in changes being made to the Coast Guard's procedural description. Furthermore, the Coast Guard's rescue service plan from 2008 has been updated following this event on 29 September 2015.

### ***1.21.2 The Swedish Maritime Administration***

The JRCC has drawn up a digital operational handbook containing instructions and support templates from the process Saving Lives. An index plan based on these instructions and support templates are also integrated directly into the management system NILS. Otherwise, the JRCC has, in autumn 2015, put together a methodology group with the aim of development factors such as boosting resources at night.

### ***1.21.3 The Transport Agency in consultation with the Maritime Administration***

Since 2013, the Transport Agency and the Maritime Administration have been meeting regularly in order to jointly draw up fundamental regulations for the VTS, including roles and responsibilities. The process is extensive and time-consuming and will take more time to complete. No joint schedule has been set up to indicate when the work will be complete, but the Transport Agency's opinion is that the work should be speeded up. The Transport Agency has stated that it should be possible to submit an initial summary of the problems and proposals for action to the Government in winter 2016–2017.

According to the Ordinance (2007:1161) with instructions for the Maritime Administration, the authority is responsible for incident reporting around the clock and is also to undertake the duties set out in Article 21 of Directive 2002/59/EC. Sweden Traffic (SafeSeaNet-SSN) has been established for this purpose, among others. A specific agreement on collaboration between authorities with respect to Swedish incident reporting via SSN was signed by the director-generals of the authorities at the end of 2014. The authorities meet regularly in order to coordinate Swedish incident reporting in the event of incidents and accidents at sea in accordance with requirements in the Vessel Traffic Monitoring Directive and guidelines from the EMSA.

Specific addressed issues are:

- how dissemination of incoming and outgoing incident reports to/from SafeSeaNet is to take place,
- which vessels and events are to be reported,
- what information is to be reported, and
- the authorities' different areas of responsibility.

### ***1.21.4 The Swedish Transport Agency***

An operational analysis of maritime supervision is being conducted within the Transport Agency. The Transport Agency has also begun a legal investigation into matters including the regulation of the MAS function. SHK has obtained parts of this.

## 2. ANALYSIS

### 2.1 Fundamental aspects of the sequence of events

KERTU ran aground at around four o'clock in the morning after the pilot had disembarked. The grounding was caused by KERTU not following the course indicated by the pilot and the vessel's position not being clear to the bridge officers on board before they followed the course indicated in the planned route.

In summary, the investigation has shown that deficiencies in communication and collaboration, combined with problematic weather conditions at night, contributed to the grounding and the subsequent sequence of events.

The communication between the pilot and the officers on board the vessel, as well as the communication between the officers on board, was not optimal. Following the accident, the lack of communication between the authorities and the vessel and between the authorities concerned was, in some cases, obvious.

When an accident occurs involving a vessel, there are many organisations that become involved. The basic premise is that all of them act within their own area of responsibility and adhere to their own procedures and that collaboration takes place between them. If there are shortcomings with any of the organisations' actions or the collaboration does not work satisfactorily, there is a risk that other involved end up in problematic situations in which their expertise and resources are insufficient.

The time of day can be assumed to have played a role in the sequence of events. The grounding occurred at around four o'clock in the morning. The pilot, the master and the VTS operator have described how they felt tired at that time. In SHK's opinion, it is reasonable to assume that these circumstances may have contributed to the sequence of events.

Despite the vessel having grounded in bad weather at a speed of almost ten knots, and then being at risk of breaking up while aground, the responsible land-based authorities have not been capable of correctly assessing the severity of the situation. The master on board the vessel has a central role, both in terms of responsibility and authority pursuant to the legislation and in terms of the practical effort on board. Several of the authorities concerned with the event involving KERTU seem to have decided to hold off taking action because of reasons including the master not having clearly requested assistance. However, it is SHK's opinion that the aim of the legislation is not for action by the authorities only to take place in the event of a request from the master. Accordingly, there are grounds to specifically draw attention to and take action with respect to the lack of initiative on the part of the land-based authorities concerned.



## 2.2 The pilotage

The pilot's decision to disembark on the eastern and leeward side of Landsort (Öja) prior to the compulsory pilotage limit because of the prevailing high south-westerly swell was probably necessary in order not to risk his personal safety. The only alternative to disembarking east of Landsort was probably to remain on board and accompany the vessel to Kokkola in Finland.

The investigation shows that the communication and hand-over between the pilot and the master in conjunction with the pilot disembarking the vessel was unclear and curt from both parties, which probably led to the crew of the vessel losing control of her position in conjunction with the pilot having disembarked the vessel. It is of the utmost importance that communication between these parties is clear, which in turn means that a master needs to be clear that he has understood the meaning of that which has been conveyed by the pilot. The information from the pilot should include the current position and advice about the onward voyage such as a new heading, distance and expected encounters with other vessels prior to reaching the open sea. In addition, the pilot, the crew of the pilot boat and the master should, for safety reasons, come to an agreement and understanding about how each is to act in conjunction with the pilot's disembarkation, particularly in bad weather.

### 2.2.1 *Communication from the pilot boat following disembarkation*

Once the pilot was on board the pilot boat, it was established that KERTU was not turning to starboard as expected. A boat man in the pilot boat, not the pilot, then made contact with KERTU on VHF and asked the master to turn to starboard to a heading of 090°.

It would be preferable, when possible, for the pilot themselves, and not a boat man in the pilot boat, to take action and ask the vessel in a clear manner to turn, and also to always begin by informing the vessel that it is the pilot who is speaking from the pilot boat. Without in any way questioning the boat men's ability, it can, in different cultures, have a major and sometimes vital significance if and how similar requests from pilot boats are received and actioned. A pilot often has a high status with masters of merchant vessels, while other occupational categories may have a lower status, which, regardless of what you may think about it, can be of significance.

### 2.2.2 *Pilotage from the pilot boat*

Because of her size, KERTU was no longer subject to compulsory pilotage on the eastern side of Landsort. However, the pilot, with the consent of the master, continued to pilot the vessel on the eastern side of Landsort towards the position for the pilot's disembarkation occasioned by the bad weather. Following the VHF call between the pilot boat and KERTU, the pilotage from the pilot boat ceased at a point in time that was relatively long before KERTU had passed though the

compulsory pilotage limit in a safe manner. Existing regulations clearly state that the pilotage is to continue from the pilot boat or in another manner until the vessel has passed the compulsory pilotage limit. SHK's understanding is that, in these conditions, the pilotage should not have ceased prior to the vessel having passed the compulsory pilotage limit. The same reasoning applies regardless of whether compulsory pilotage applies or not, if a vessel chooses to engage a pilot, the pilotage should not cease inside the compulsory pilotage limit.

However, this is dependent on the pilot having access to suitable navigation equipment on board the pilot boat that enables them to continue the pilotage without endangering the safe operation of the pilot boat. In this case, the pilot boat was not equipped for simultaneously performing these two duties, which is a shortcoming. However, the Maritime Administration intends to introduce such equipment. One alternative in the situation in question could have been for the pilot boat to have remained in the same place for 15 minutes while guiding KERTU out and through the compulsory pilotage limit in accordance with the applicable regulations and without putting its own safe navigation at risk. The Maritime Administration should consider appropriate measures for ensuring that procedural descriptions and regulations pertaining to pilotage are developed and can be complied with in a more expedient manner.

### **2.3 The vessel's route planning and the communication between the master and the chief officer**

The pilot informed the crew at an early stage of his intention to disembark east of Landsort as a result of the bad weather. It appears that neither the chief officer nor the master made any change to the planned route in the digital chart once they had been informed of the approximate position for the pilot's disembarkation. It is also thought that this matter had not been discussed with the pilot. All in all, this may have been decisive to the vessel's choice of route after the pilot's disembarkation.

Judging from the vessel's planned route on the paper chart, which was presented to SHK following the accident, the master intended to turn to a heading of 070° following the pilot's disembarkation, which leads north of Gunnarstenarna and out into the open sea.

When the chief officer came up onto the bridge after having dropped off the pilot and was filling in the logbook, the master told him to take a current position. The master's aim was to find out the current position as he was a little unsure about this. The chief officer understood this to mean that he was to take the position for the purpose of entering this in the logbook together with the time the pilot was dropped off. After this, the master said "new heading 070°", which the chief officer interpreted as the master simply wanting to inform him of the new heading that he had turned to. In turn, the master interpreted the heading having been repeated by the chief officer to mean that the

chief officer, having taken a new position on the chart, confirmed that a new heading of 070° was a correct heading to proceed clear of all reefs. This misunderstanding led to KERTU running aground shortly afterwards and shows how important it is to have a clear communication when operating a vessel, regardless of whether or not there is a pilot on board. The information should also always be repeated in order to ensure that the recipient has understood the meaning of what has been said.

There has not been sufficient communication concerning the vessel's future route planning between the pilot and the vessel during the pilotage itself, which is unfortunate and may probably have been decisive to the vessel's chosen route following the pilot's disembarkation. This, combined with the misunderstanding between the chief officer and the master concerning the information regarding position and appropriate heading immediately prior to the grounding, was probably the primary cause of the grounding itself. A contributory cause was that too little consideration was given to the prevailing drift given the weather.

#### **2.4 The VTS's tracking in critical situations**

The investigation shows that the VTS did not track the vessel in an appropriate manner, at least during the final five minutes prior to the grounding, in spite of the VTS having been aware that the pilot was to disembark inside of the compulsory pilotage limit. This appears to have primarily been due to the VTS operator having lost concentration on the tracking in order to get up another chart that would help him to track KERTU at a later stage. It appears unfortunate that a VTS operator must change chart during an ongoing tracking operation and this is something that the Maritime Administration should take into consideration when the equipment is upgraded or replaced in the future.

SHK is of the opinion that the Maritime Administration could reduce the risk of a similar event by ensuring in an appropriate manner that procedural descriptions and regulations for pilots and VTS operators who are working together are developed and complied with in a more purposeful manner.

#### **2.5 Initial contact with KERTU from land**

The vessel grounded in bad weather at a speed of almost ten knots with a risk of breaking up while aground. Following the grounding, the VTS was in contact with the vessel on two occasions. These were the only two occasions on which contact was made directly with the grounded vessel from land over the course of the four hours she was aground, in spite of the fact that various authorities were able to establish that:

- The grounding had taken place and KERTU stated that she was manoeuvring in order to continue her voyage.

- The master sounded somewhat nervous and jumpy when he contacted the JRCC. The call was then connected through to the Coast Guard NE and the master informed them that KERTU was leaking oil.
- KERTU was under power and using her propeller, which a vessel from the Coast Guard observed and reported to their own rescue coordinator.

SHK is of the opinion that these circumstances, of which the authorities were aware, were clear signals that the master was in great need of support and assistance in order to solve the situation that had arisen. In spite of this, no authority, aside from the VTS on two occasions, took the initiative to make direct contact with the vessel's master, which is a serious shortcoming. Such contact should have provided better chances of there being a more controlled and less risky subsequent sequence of events.

As the Transport Agency had not been in contact with the vessel, there were also no injunctions concerning the vessel's operation. Consequently, it was the master's responsibility to decide what action would be taken following the grounding. Just over four hours after the grounding, KERTU manoeuvred herself off the ground in the bad weather. She arrived at the anchorage in the open sea south of Landsort two hours later. During this voyage, KERTU navigated on the wrong side of a buoy that marks a reef at a depth of 7.7 metres, which the VTS attempted to draw the vessel's attention to via VHF. The vessel's draught was almost six metres and some waves were probably at least three metres high. The actions of the crew indicate that they were severely affected by the complex and critical situation and also shows that there was a marked need for support and assistance from the authorities.

## **2.6 Other influential factors**

### **2.6.1 *The weather***

The weather at the time of the event played a central role in various ways, which is common in shipping. It appears that many of those involved in the events following the grounding did not find out about and, in some cases, perhaps did not understand the potential consequences of the prevailing weather conditions with a large swell and a grounded vessel. It is important that the parties involved always check the current weather situation at the site of the accident as it may be significantly different in the outer archipelago and inner archipelago, even though there is sometimes only a short distance between these. It is of great importance that all those who work in operational shipping are aware of and have the capability to understand the consequences bad weather has for vessels and crew, regardless of whether they are serving on board or on land.

### **2.6.2 *Monitoring of VHF channels***

All vessels at sea, even those with a pilot on board, are obliged to always listen to VHF channel 16. At the same time, vessels that are within a VTS area, in this case VTS Landsort (named as VTS Södertälje in radio communications), must also monitor VHF channel 68, which is the working channel. In addition to these channels, pilots and boatswains in this pilotage area use a third VHF channel as a working channel between themselves, which leads to a vessel being required to monitor three different VHF channels simultaneously. It should be possible to reduce this to only two channels, which should reduce the risk of any party missing information on VHF that is vital to them.

### **2.6.3 *Compulsory pilotage lines***

There are currently no compulsory pilotage lines drawn on either the digital charts or the paper charts of the Swedish coast. Nor does there appear to be any specific national or international symbol denoting compulsory pilotage lines. However, there is a boarding point marked on the chart at which pilot embarkations usually takes place for vessels that are to be piloted. The boarding point is often located further out to sea than the compulsory pilotage line, partly because the pilot has to have time to acclimatise on board the vessel before the pilotage begins. Disembarkation of pilots, i.e. when the pilot leaves the vessel, does not usually take place at the boarding point, but further into the fairway.

The results of several of SHK's investigations indicate that the compulsory pilotage lines appears unclear to both vessels' officers and the pilots themselves. The time at which the pilotage ceases and the vessel's officers take over operation of the vessel is often regarded as a critical situation, especially if the officers have no previous experience of the area, as is the case in this accident.

The compulsory pilotage lines are now marked on chart excerpts available on the Transport Agency's Swedish language website and on the Maritime Administration's website under "passage plan", with the heading "alternative disembarking". As the compulsory pilotage lines are not marked on charts, SHK is of the opinion that there is reason to have a clearer explanation of the meaning of compulsory pilotage lines on the Maritime Administration's website. In addition, it is a shortcoming that chart excerpts are not available as a supplement on the Transport Agency's English language website.

If the aforementioned action is taken, the position at which pilotage will cease would be more clear to professional seafarers, pilots and the VTS. This would also be beneficial to vessels' route planning, which should be undertaken prior to the vessel leaving the quay or as soon as the next destination is known.

#### **2.6.4 Pilot disembarkation positions at Landsort**

When the pilot leaves a vessel at the compulsory pilotage line on the western side of Landsort, the vessel then has a one nautical mile “corridor” that has to be passed prior to the vessel entering open, free and deep water.

When the pilot disembarks a vessel at the compulsory pilotage line on the eastern side of Landsort and the vessel is then to go east or north, the vessel subsequently has a corridor that is two nautical miles wide both south and north of Gunnarstenarna that has to be passed before the vessel enters open, free and deep water. The onward voyage without a pilot on board having passed the compulsory pilotage line should thus be easier to navigate to the east of Landsort than the equivalent voyage to the west of Landsort.

The pilot’s disembarkation and the time immediately following this are generally a critical period and place great demands on the pilot and the crews of both the pilot boat and the vessel. During SHK’s interview with the pilot of KERTU, an alternative approach to pilot disembarkation on the eastern side of Landsort was proposed. This involved the pilot, when possible, disembarking the vessel with the vessel’s heading as close to the final destination of the pilotage as possible, which is usually the open sea and as far from any dangers to navigation as possible. SHK believes that there should be an endeavour to adhere to the same basic principle when pilots disembark in general, not just when doing so at Landsort.

#### **2.7 The Joint Rescue Coordination Centre (JRCC)**

Shortly after the grounding, the JRCC received information from the VTS that KERTU had run aground and that “the vessel is not taking in water at present”. On the basis of this information, the JRCC classified the case as “NIL”, i.e. there is no threat to human lives and search and rescue is not required.

Based on SHK’s understanding of the instructions that apply to the JRCC, it appears to have been more natural to classify the case as at least “uncertainty”. According to the instructions, this would have meant that the JRCC itself would have gathered information about the event and it would probably have been more natural to wake up one of the rescue coordinators who was stand by.

The Maritime Administration should take appropriate action in order to avoid similar situations arising in the future.

Shortly after KERTU had anchored, the master requested immediate assistance as the water level in the cargo hold was high and was continually rising as a result of water leaking in, without the vessel being able to pump it out by her own capacity.

When this information reached the JRCC, the classification was changed from “NIL” (the lowest classification of four possible levels) to distress and direct contact was established for the first time with the vessel’s master, seven hours after the grounding. At the same time, the JRCC made contact with the Coast Guard and the Transport Agency so that they could collaborate. In this situation, the JRCC also made it known that KERTU’s crew members should be evacuated, which they were onto one of the Coast Guard’s nearby vessels, with the exception of the master and the chief engineer.

According to SHK, the JRCC’s role in the MAS function (point of contact), as well as how the MAS function is intended to function in the event of serious marine casualties is unclear.

## 2.8 The VTS

Normally, a pilot is sent out to a vessel in distress. The fact that the VTS operator did not take action in order to get a pilot out to the site of the accident was probably due to an action of this type not being included on the check-list the operator was using. However, the Maritime Administration’s internal procedures do state that a pilot is to be sent out to assess the situation. No one else from the Maritime Administration took action to this end either.

The VTS and the pilot operators are in the same location in Södertälje. When the JRCC changed its classification to distress, the Maritime Administration offered to send a pilot to the site of the accident, which also took place.

With regard to the regulations for VTS operations, it can be noted that Section 6 of the Transport Agency’s regulations and general advice (TSFS 2009:56) on vessel traffic services states that a vessel may be given warnings and advice of significance to its operation when this is justified for safety reasons.

SHK’s opinion is that the use of the word “may” leaves room for the interpretation that it is the VTS that determines whether or not the vessel is to be given relevant information. If the word “may” is replaced with the word “shall”, the VTS operator’s duty becomes clearer.

SHK gave recommendations regarding this to the Transport Agency in its final report RS 2014:01. However, the Transport Agency is of the opinion that it is prevented from changing the regulations in this way because it lacks the authority to stipulate how the Maritime Administration’s VTS operations are to be run.

In its final report RS 2014:01, SHK also gave the Maritime Administration a recommendation to ensure that relevant VTS information is provided to vessels. Subsequently, the Maritime Administration have made their operational procedures clearer so that they now state that

the VTS operator is to use all available means to avoid forthcoming accidents.

## **2.9 The subsequent sequence of events**

### **2.9.1 *The Coast Guard's rescue operation***

The Coast Guard's contact with the master took place primarily by telephone, which may be disadvantageous as this provides none of the other parties involved, such as the VTS or JRCC, with the opportunity to monitor what is said in communications between the vessel and the Coast Guard's rescue coordinator. If the communication had instead taken place using VHF, all the parties involved would have been able to both hear and participate in the communication. If the communication had instead been conducted via RAKEL<sup>44</sup>, the authorities concerned would have been able to hear one another and participate. However, that would have left out KERTU, which, as is the case for the majority of merchant vessels, was not equipped with RAKEL.

During this investigation, it has not been possible to retrospectively monitor the Coast Guard's telephone calls with the master as the Coast Guard's command centre had no means to record these. SHK believes that this is a shortcoming.

The investigation has shown that the Coast Guard's command centre did not have a clear understanding of the role and function of the VTS. This has also been noted by the authority itself. Furthermore, even after the updates that have taken place as a result of this event, the Coast Guard's internal procedures do not contain information about the Coast Guard's role in the MAS function or about how the MAS function is intended to function in the event of serious marine casualties.

### **2.9.2 *Initial consultation meeting with the authorities concerned***

In conjunction with the vessel anchoring, it was decided following consultation involving the Transport Agency and the Coast Guard that the vessel would be permitted to seek a port of refuge in Nynäshamn. As far as SHK has been able to ascertain, it was, in this case, only at this time that the Coast Guard first established a partnership with the Transport Agency.

The Coast Guard subsequently held a consultation meeting for preventive purposes with the authorities that had environmental responsibilities on land in Nynäshamn. The Coast Guard has subsequently established that the focus of such consultation meetings is usually on the land-based operations, while authorities such as the Maritime Administration and the Transport Agency are easily forgotten, which is unfortunate. In addition, marine casualties are often long drawn-out pro-

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<sup>44</sup>RAKEL – a communications system used by critical societal functions in Sweden. For example, it is used by fire and rescue services, ambulance services, the police and alarm centers.



cesses that run over a longer period of time than land-based organisations are used to. It is of great importance that all land-based organisations who get involved in marine casualties have this insight and plan and act in accordance with these prerequisites.

### **2.9.3 *The deteriorating situation***

When the situation for KERTU deteriorated and became an emergency just after she anchored, the Transport Agency changed the port of refuge to Oxelösund. At the same time, the Coast Guard made a new outline decision (BIS 2) following contact with the Transport Agency to primarily prioritise emergency pumping in order to stabilise KERTU, who was close to capsizing at this stage. From what has emerged in the investigation, SHK has come to the conclusion that it was only at this time that the Transport Agency actually got its functions up and running in the manner they are intended to function. The fact that this took place was a decisive factor in preventing KERTU from capsizing and sinking.

An intensive effort continued for the remainder of the afternoon and evening in which the collaboration between all parties involved is, on the basis of what has emerged, thought to have functioned well in the circumstances.

### **2.9.4 *Subsequent consultation meetings***

Following the decision to appoint Oxelösund as the port of refuge, the Coast Guard held several consultation meetings with the authorities who had environment responsibilities on land in Södermanland. The focus here was also on land-based organisations such as the County Administrative Board of Södermanland, Oxelösund Municipality and the municipal fire and rescue service. In contrast to the initial consultation meeting in Stockholm County, the port and the vessel's insurance company were now also participating, but there was still no representative from the Maritime Administration or the Transport Agency. In spite of the fact that these authorities were not represented, which was a shortcoming, SHK concludes that it was valuable for those who participated and that holding these meetings was a good initiative. It would be meaningful if the experience gained from these meetings is able to lead to updates to procedural descriptions and check-lists and is also used in the context of exercises by the organisations involved in other shipping accidents.

### **2.10 *The Transport Agency's preparedness***

SHK does not supervise the Transport Agency. However, it is within SHK's remit to elucidate the sequence of events in conjunction with an accident, to elucidate why an accident occurred and provide evidence on which to make decisions concerning actions that aim to avoid any repetition or minimise the consequences of a similar event. In this context, it is rarely sufficient to limit the investigation to those persons who were involved directly in the sequence of events. The

actions of these persons must be placed into the context of the organisational environment in which they act and the regulations and procedures that regulate their activities. It is therefore not unusual for SHK to also review, within the scope of its investigations, organisational and systemic factors of the persons and organisations involved in an accident.

The investigation into KERTU's grounding shows that the initial sequence of events that led to the grounding involves factors that concern the crew, the weather, the time of day, the pilotage and the VTS service and which had an impact on the sequence of events. These matters have been investigated and illuminated in the report. The investigation also shows that the Transport Agency's actions – or rather its inaction – in the initial hours had a major negative impact on the subsequent sequence of events, which almost led to the loss of the vessel. When the Transport Agency began to take action, about ten hours after the grounding, this was in turn a factor that was crucial to saving the vessel from sinking.

Against this background, it has been natural for SHK to investigate in more detail the delay in the Transport Agency taking action and its procedures for similar events.

The Transport Agency is one of the authorities that the Government has appointed to have an officer on duty round the clock tasked with initiating and coordinating the initial work of detecting, verifying, raising the alarm and providing information in the event of serious emergencies. The authority is also to have the constant capability to establish a command function within its operational area if there is a requirement to support and collaborate with others concerned in conjunction with an emergency. The legislation applicable in the event of shipping accidents is dependent on the Transport Agency being capable of acting immediately, e.g. by ordering a master on a vessel to take or to not take certain actions when necessary. The Transport Agency has a procedural description of how the emergency response to incidents and accidents at sea is to be conducted.

### ***2.10.1 The Transport Agency's actions in the event of KERTU's grounding***

#### *Officer on duty*

The Transport Agency's officer on duty received the alarm concerning the grounding about 30 minutes after it occurred. The officer on duty contacted the emergency surveyor in the relevant geographical area shortly afterwards and handed over the case.

#### *Marine inspectors on duty*

As far as has emerged, the marine inspector on duty gathered information by telephone over the course of the first few hours following the accident. However, no MAS function was initiated and KERTU

was not contacted either. Nor was a marine inspector or pilot sent out to the site of the accident at this stage, which should have happened in accordance with the applicable procedural descriptions. However, the feasibility of coordinating transport out to the vessel in distress was investigated in conversations with the pilot planning service and the Coast Guard. The Coast Guard decided to send its vessel KBV 311, which had an approximately two-hour voyage to the site of the accident.

The marine inspector on duty has stated that he was stressed about the situation as, in spite of being on call as a marine inspector on duty, he was also scheduled to conduct a planned survey on another vessel that he felt could not be cancelled. Because of this, he handed over his role as marine inspector on duty to a colleague four hours later, briefly describing the grounding and that the colleague was to get on board KERTU when it was possible to do so in a safe manner. As KERTU came free of the ground under her own power just after the hand-over and the situation became a clear critical emergency, this means that the new marine inspector on duty did not initially have optimal conditions for dealing with the emergency situation that had arisen. If the marine inspector on duty had been able to focus on the grounded vessel completely from the moment the alarm was raised, it is more likely that he would have acted in a more active way, made direct contact with the master, initiated the MAS function, ensured there was a pilot close to the site of the accident and either travelled there himself or had a colleague travel to the area. The hand-over probably had a negative impact on the Transport Agency's operation over the course of the first five hours following the grounding.

During the investigation, it has emerged that the Transport Agency's marine inspector on duty who are on call are permitted to schedule surveying visits, even when these are far away from where they are stationed, that are difficult to cancel. SHK believes that the appropriateness of an emergency surveyor scheduling other tasks or meetings that are not easy to cancel can be strongly questioned. In addition, it is often beneficial to the sequence of events if the person who is expected to act as marine inspector on duty in the event of a serious shipping accident has a reasonable travelling time to the geographical area for which they are responsible as they are expected to travel to the site of the accident.

#### *Activation of the MAS function*

When the colleague took over the role of marine inspector on duty, they quickly found out that KERTU had come free of the ground and understood that this was a serious situation with a high risk that the vessel would be wrecked. The marine inspector realised that this was a MAS case and therefore began working to get this function up and running as well. If the master does not take any action to prevent the vessel sinking, the marine inspector on duty has to consider issuing them an order to take emergency action. However, the marine inspec-

tor on duty must contact either the officer on duty or the management of the Transport Agency's Civil Aviation and Maritime Department prior to making such a decision. The investigation has shown that during the morning and early afternoon, there was a difference of opinions about whether or not the MAS functions were to be established, which probably delayed the Transport Agency's operation at this time.

However, the Transport Agency has subsequently explained that no fully developed MAS function was ever established during the event involving KERTU as the situation was deemed to be under control once the water had been pumped out and the immediate risk of the ship's loss had thus been reduced. Many organisations involved during the sequence of events involving KERTU has stated during the investigation that they felt the absence of the Transport Agency's role in the first eight to ten hours as they consider this to be central at the site of an accident and to the sequence of events.

Furthermore, it has emerged during the investigation that there is a lack of clarity and a general uncertainty about how the MAS function is intended to work and be organised in the event of a marine casualty. It is clear that the function is to be located at the JRCC's facilities in Gothenburg, but there is, in SHK's opinion, otherwise a need to clarify in regulations or instructions aspects such as when and by whom a MAS function is to be initiated.

When it was finally decided to initiate the MAS function about ten hours after the grounding, the person appointed to the role was at their place of work in Norrköping, i.e. three hours' away from the JRCC in Gothenburg. During the car journey there, he was however in contact with all those involved and preparing a MAS operation. He also subsequently conducted stability calculations and provided advice and directions, primarily to the master and the Coast Guard, concerning how to avoid the vessel capsizing at the site of the accident.

In spite of the marine inspector on duty having already, early in the morning, taken action to activate the MAS function, this did not take place until much later. The vessel had run aground at a speed of almost 10 knots in bad weather and was in a vulnerable position, which, according to the Transport Agency's own procedural descriptions, should have been grounds to activate the MAS function quickly. The JRCC has stated that when the classification was changed to sea rescue, contact was sought with both the Transport Agency and the Coast Guard for collaboration, which is consistent with the time at which the MAS appear to have been initiated in practice. It is SHK's understanding that the Transport Agency's MAS function, once it was up and running, played a major and important role for the master on board KERTU, for the environmental rescue coordinator and for others involved, which highlights how important it is for the Transport Agency to act and have the right expert staff in roles such as MAS and marine inspector on duty that are so important in this context.

### *SHK's assessment*

SHK's investigation shows that the Transport Agency did not comply with its own procedures when KERTU ran aground. It is clear that this had a negative impact on the subsequent sequence of events. Furthermore, the fact that the Transport Agency did not act in the way that was expected created problems for other authorities and organisations.

SHK concludes that one of the factors that influenced the Transport Agency's actions in this case and resulted in delays was that there were internal differences of opinion within the Transport Agency of a type that is associated with issues of teamwork and leadership.

Furthermore, a review of the Transport Agency's preparedness function is currently taking place. With reference to the ongoing review, the Transport Agency has indicated that it is not certain that in future this function will work in the same way as it has done in the past. The information that emerged in the interviews with certain representatives of the Transport Agency can be understood to indicate that it is believed to be unproblematic that the internal procedures were not complied with as they have been called into question and are subject to a review.

SHK does not have any opinions on the need for review of the Transport Agency's preparedness function or on the fact that there may be changes in future. Nevertheless, it appears remarkable to use the fact that the procedures are subject to review as justification for them not having been complied with.

SHK is of the opinion that the Transport Agency's ongoing review process should take into account the need for the authority to have the ability to supply vessel-specific expertise in the event of serious marine casualties. Furthermore it should be ensured that existing procedures are complied with until such time as new or amended procedures have been worked out.

#### **2.10.2 *The need for a robust preparedness for shipping accidents***

In the event of marine casualties and incidents at sea, the actions of the vessel's master can be decisive. It is therefore vital that the master is also able to obtain advice about how they should act. Normally, the master can obtain this from the Transport Agency's marine inspector on duty, who normally goes on board the vessel or is in close proximity to the damaged vessel.

The situation on board a vessel in the event of a marine casualty can be both physically and mentally demanding for the master, the crew and the marine inspector on duty. As is the case for other coastal nations within the EU, Sweden is required to always have a working maritime assistance service (MAS) that is land-based in an environment where the weather is calm, with access to the internet, telephones and the opportunity to call in expertise in the area in order to

provide the master and the marine inspector on duty at the site of the accident with stability calculations and other advice for avoiding pollution of the environment, damage to property or threats to the life and health of those on board.

SHK's opinion is that the ability to act effectively as the marine inspector on duty at the site of an accident or as the MAS in situations similar to that involving KERTU is dependant to a great extent on having extensive professional knowledge of shipping, e.g. with regard to vessels' stability, knowledge of vessels and an understanding of complex, stressful situations at sea.

In the case of KERTU, it was primarily the Coast Guard that acted at the site of the accident. The Coast Guard cannot, however, be expected to have such wide and far-reaching expertise, e.g. with regard to knowledge of stability and vessels, as should be required by those responsible for the MAS function. This expertise must be found at the Transport Agency.

During the investigation, the Transport Agency has stated that it has three designated people who have the task of taking responsibility for the MAS function and that one of these people is to present themselves at the JRCC in Gothenburg in the event of accidents and serious incidents. However, it appears that there are no requirements in terms of the time it takes for them to get to Gothenburg or any other rules or procedures to ensure that the people responsible for the MAS are not already involved in other duties that are an impediment to them fulfilling this role. As this function is dependent on a small number of people, the system is vulnerable. SHK is of the opinion that the Transport Agency should take action to develop its preparedness and MAS function in order to ensure that it becomes sufficiently robust.

## **2.11 Ports of refuge**

There is no general obligation for the owner of a port to accept a vessel in distress. Nor can the master of a vessel demand access to the port. Another thing is that there are provisions concerning exemption from criminal responsibility in emergencies in Chapter 24 of the Swedish Penal Code that imply that the master cannot be held criminally responsible for, for example, unlawful conduct if, in an emergency situation, they enter a port without the permission of the port's owner.

The investigation has shown that there is some uncertainty among not only the Transport Agency and the Coast Guard, but also Ports of Sweden with regard to the matter of appointing ports of refuge.

The responsibility for rescue operations is shared between central government and the municipalities and its scope varies depending on which type of operation is being undertaken.

In the case of search and rescue, the Maritime Administration is responsible for the operation, which is normally led by a rescue

coordinator at the JRCC. In such cases, the operation encompasses saving lives.

In the case of environmental rescue services at sea, the Coast Guard is responsible for the operation. In such cases, the operation encompasses saving the environment.

The municipal fire and rescue service is responsible for that part of a rescue operation that takes place in a port area or in any inland lake other than Vänern, Vättern or Mälaren. In such cases, the operation encompasses saving life and health, property and the environment.

There are no specific provisions concerning saving property at sea in this context. This is instead encompassed, to some extent, by the national Maritime Code's provisions concerning salvage.

The provisions in Chapter 6, Section 2 of the Civil Protection Act on encroachment on others' rights are far-reaching and also encompass a right for the rescue coordinator, if this is justified, to order a port's owner to take or endure certain action. If a rescue operation is in progress, the rescue coordinator (i.e. the JRCC, the Coast Guard or the municipal fire and rescue service), with the support of the Civil Protection Act, can force a port to accept a vessel without the port's owner being able to oppose this. However, there is an important limitation in this provision. If action of this type is directed at a vessel and based on emission or feared emission into the water from a vessel, it is the Transport Agency who has to make a decision with support of LÅFF. However, the Transport Agency does not have the right to encroach in the rights of the owner of a port. One consequence of this is that if the Transport Agency orders a vessel to seek a certain port and there is no decision from rescue coordinators to requisition the port, the port's owner can refuse to accept the vessel.

The greatest risk for an owner of a port who allows their port to be used by a vessel in distress is probably being affected by the loss of income for the operations that could have been undertaken if the vessel in distress had not been blocking one or more berths. In principle, there is no opportunity to receive compensation for purely financial losses in accordance with the Tort Liability Act, provided the loss has not arisen through criminal action or been caused by errors or negligence on the part of a government authority. The only opportunity ports' owners have to receive compensation is instead to insure themselves against such losses.

The current rules thus provide a strong incentive for ports' owners to oppose their port being used to receive a large vessel in distress. There are also several examples of vessels in distress at sea without there being judged to be a risk to human life having been denied access to European ports.

One way to minimise the risk of such a situation arising in Swedish ports may be to introduce a central government financial guarantee for the port's loss of income.

### ***2.11.1 Responsibility for the rescue service***

In the event of rescue operations at sea, the responsibility is functionally shared in that the Maritime Administration (JRCC) is responsible for search and rescue (saving life), while the Coast Guard is responsible for environmental rescue. However, the boundary between central government and municipal rescue services is geographical. Central government is responsible for rescue operations in central government waters and in the lakes Vänern, Vättern and Mälaren, but not in other lakes, watercourses, channels and ports.

In the case of the accident involving KERTU, responsibility for the rescue operation was initially that of central government and at various stages of the sequence of events, staff from the Coast Guard and the Maritime Administration were rescue coordinators. When the vessel passed into the port of Oxelösund, responsibility for the rescue service transferred to the municipal fire and rescue service. The authorities concerned collaborated with one another and agreed that the Coast Guard would continue to assist KERTU until the vessel was moored at the quayside.

In general, however, it is a risk factor that responsibility for the rescue service is transferred from central government to the municipality when a vessel in distress passes into a port area or a channel. This requires collaboration between the various authorities involved in the rescue operation. The central government rescue coordinator and their municipal counterpart may have different ideas about whether it is justified to force a vessel to seek a certain port. In theory, this would leave a vessel lying at the boundary between the two areas of responsibility. Although it is unlikely that the situation will arise in practice, it is possible to come to the conclusion that if there are shortcomings in communication and collaboration between the authorities concerned, the municipal rescue coordinator may be faced with a fait accompli, which naturally reduces their chances of implementing a satisfactory rescue operation.

One way to reduce the risk of this arising in Swedish ports may be to, instead of having a geographical boundary (port area or channel) as is the case now, replace this with a system in which responsibility for the rescue operation is transferred to the municipal fire and rescue service only once the vessel is safely moored at the quayside. One example that can be mentioned is that in Finland the municipality only becomes responsible once the vessel is moored in port.



## 2.12 Other observations

### 2.12.1 *Risk analysis for vessels in Oxelösund*

The investigation shows that Oxelösund Municipality lacked action plans and risk analyses for dealing with fires as well as capsizing and sinking vessels in the port area. The Port of Oxelösund had, however, identified a number of relevant risks, but not fires on board vessels, which is a risk that should be taken into account.

In a previous investigation report, RS 2015:07, SHK gave the County Administrative Board of Västra Götaland a recommendation to follow up the fire and rescue service's ability to conduct effective rescue operations in the event of shipping accidents within the municipal area of responsibility, which should also be beneficial for the County Administrative Board of Södermanland to take note of.

The same investigation, RS 2015:07, also included a recommendation that the Civil Contingencies Agency review the level of knowledge and expertise and the planning within the municipal fire and rescue services for rescue operations involving shipping and when necessary take action in order to reinforce the capability to conduct rescue operations together with other authorities in the event of shipping accidents.

### 3. CONCLUSIONS

#### 3.1 Findings

- 1) The vessel had well-functioning navigational aids, with the exception of the pilot plug, which did not work.
- 2) Communication and hand-over between the pilot and the master was inadequate during the final stages of the pilotage.
- 3) The pilot disembarked inside the compulsory pilotage line east of Landsort as a result of bad weather.
- 4) There were shortcomings in the vessel's determination of her position and the internal communication between the master and the officer on watch on board in conjunction with the pilot's disembarkation.
- 5) There was no pilotage or guidance from the pilot boat.
- 6) There were shortcomings in the VTS's tracking of the vessel following the pilot's disembarkation.
- 7) The vessel grounded at a speed of 9.8 knots in bad weather, with a strong swell, shortly after the pilot disembarked.
- 8) The VTS raised the alarm with all the organisations concerned following contact with the master.
- 9) Over the course of the first four hours after the grounding, the master attempted to actively manoeuvre the vessel off the ground. He informed the VTS of his intentions.
- 10) The Transport Agency's actions were initially delayed and unclear.
- 11) The JRCC classified the case as NIL and relied on second-hand information.
- 12) The Coast Guard sent one of its vessels to the site of the accident and thus established that KERTU was under power and using the propeller and that a diesel spill had occurred.
- 13) Aside from the VTS, no government authority contacted the vessel in the first four hours following the grounding.
- 14) No marine inspector or pilot was sent to the site of the accident.
- 15) The master informed the Coast Guard and the JRCC that an oil spill had taken place. The vessel freed itself from the ground after four hours.

- 16) When KERTU came off the ground and headed south, the Transport Agency's officer on duty was alerted by Sweden Traffic.
- 17) Shortly after anchoring, with rising water in the cargo hold, the vessel requested assistance for an evacuation.
- 18) Following the master's request for assistance, the JRCC reclassified the case from NIL to distress and the majority of the crew were evacuated.
- 19) The MAS function was only initiated in practice ten hours after the grounding and became at this time a support for all parties involved.
- 20) According to the Transport Agency, no formal MAS operation was initiated.
- 21) The Coast Guard and the Transport Agency collaborated and were able to stabilise KERTU. The tugboats towed the vessel to Oxelösund once KERTU had been made safe. The Transport Agency designated the Port of Oxelösund as the port of refuge.
- 22) The Coast Guard organised several consultation meetings with land-based organisations such as county administrative boards and municipalities. The focus of these meetings was providing information about the current situation. However, the Maritime Administration and the Transport Agency were not invited.
- 23) Oxelösund Municipality lacked action plans and risk analyses for dealing with fires and capsizing and sinking vessels in the port area.
- 24) There is thought to have been great uncertainty and ignorance among several authorities with respect to the MAS function, its role and how it is activated.
- 25) There are no Swedish definitions of MAS, place of refuge or vessel in need of assistance set out in any acts, ordinances or regulations.
- 26) There is a need for collaboration exercises for all the government authorities involved in the event of major shipping accidents.
- 27) There is a need for a review of the legislation governing the use of ports of refuge.
- 28) The Transport Agency's round the clock preparedness and competence is vital to the country's ability to quickly and effectively deal with maritime accidents.

### 3.2 Causes

The grounding was caused by inadequate communication concerning the vessel's position and future route in conjunction with the disembarkation of the pilot, combined with misunderstanding between the master and the officer on watch on board shortly thereafter.

Contributory causes were that there was no guidance from the pilot boat and that there were shortcomings in the VTS tracking and to some extent, the fact that the pilot, the master and the VTS operator were tired.

## 4. SAFETY RECOMMENDATIONS

The Maritime Administration has explained that it will be equipping pilots with a mobile navigation system over the course of 2016. This will make it possible to monitor another vessel via AIS at the same time as the pilot boat's own safe navigation can be maintained. Consequently, SHK finds no grounds to issue any safety recommendations to the Maritime Administration with respect to this matter.

### **Hansa Shipmanagement Ltd. is recommended to:**

- Actively follow up and improve procedures for safe route planning and communication on the bridge, both with and without a pilot on board. See section: 2.3. (*RS2016:10 R1*)

### **The Swedish Maritime Administration is recommended to:**

- Actively follow up procedures and training regarding the disembarkation of pilots and guidance from pilot boats, combined with the conditions for tracking inside of the compulsory pilotage lines from the VTS, where possible. See sections: 2.2, 2.2.1, 2.2.2, 2.4, 2.6.1, 2.6.4. (*RS2016:10 R2*)
- Actively follow up procedures and training for staff at the JRCC regarding communication with vessels at risk, weather conditions, classification of cases and risk analyses in conjunction with serious maritime accidents. See sections: 2.5, 2.6.1, 2.7. (*RS2016:10 R3*)
- Consider and evaluate the appropriate number of VHF channels during pilotage and appropriate communications between vessel and pilot boat during the embarkation and disembarkation of a pilot. See sections: 2.2.1, 2.6.2. (*RS2016:10 R4*)

- Consider and evaluate the feasibility and advantages of clearly visualising the compulsory pilotage lines in relevant publications. See section: 2.6.3. (*RS2016:10 R5*)

**The Swedish Coast Guard is recommended to:**

- Evaluate and consider the installation of recording functionality with respect to all communications at its control centres. See section: 2.9.1. (*RS2016:10 R6*)

**The Swedish Transport Agency is recommended to:**

- Taking this report into consideration, conclude its ongoing operational analysis regarding maritime supervision in conjunction with major maritime accidents, taking particular account of factors that may have an impact on maritime safety. See sections: 2.6.1, 2.10, 2.10.1, 2.10.2. (*RS2016:10 R7*)
- Evaluate and consider clearer internal procedures and training, primarily with respect to functions and organisation in conjunction with maritime accidents. See sections: 2.6.1, 2.10, 2.10.1, 2.10.2. (*RS2016:10 R8*)
- Ensure that the Transport Agency maintains around-the-clock readiness for using marine inspectors and MAS with the relevant expertise in the event of maritime accidents in Swedish waters. See sections: 2.6.1, 2.10, 2.10.1, 2.10.2. (*RS2016:10 R9*)

**The Swedish Transport Agency is recommended, in consultation with the Swedish Maritime Administration and the Swedish Coast Guard, to:**

- Work out clearer common procedures and working practices, primarily those pertaining to the MAS function in the event of major maritime accidents. See sections: 2.7, 2.9.1, 2.10.1. (*RS2016:10 R10*)
- Introduce, in an appropriate manner, regular joint exercises concerning major maritime accidents. See section: 2.1. (*RS2016:10 R11*)

**The Ministry of Enterprise and Innovation is recommended to:**

- Evaluate applicable legislation concerning vessels port of refuge, particularly as regards the authority to order a port to accept a vessel in distress and financial guarantees for ports. See section: 2.11. (*RS2016:10 R12*)

- Evaluate applicable legislation and authorisation concerning MAS, protected places and vessels in need of assistance. See section: 2.10.1. (*RS2016:10 R13*)

**The Ministry of Justice is recommended to:**

- Evaluate applicable legislation concerning the boundary between central government and municipal responsibility for the fire and rescue service in ports and channels in conjunction with maritime accidents. See section: 2.11.1. (*RS2016:10 R14*)

The Swedish Accident Investigation Authority respectfully requests to receive, **by 3 March 2017 at the latest**, information regarding measures taken in response to the recommendations included in this report.

On behalf of the Swedish Accident Investigation Authority,

Jonas Bäckstrand

Rikard Sahl