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## Preliminary statement

L-01/10

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Aircraft; registration and type	SE-JGA, Robinson R44 Astro
Class, airworthiness	Normal, valid Certificate of Airworthiness with ARC <sup>1</sup>
Owner	Skärgårdsflyg i Stockholm / Skärgårdsgruppen i Stockholm AB
Time of occurrence	11.01.10, 14:37 in daylight Note: All times are given in Swedish standard time (UTC + 1 hour)
Place	NW of Näsudden on Ornö island, Stockholm county, (posn. 59°04.6' N, 18°21.0' E; at sea level)
Type of flight	Private
Weather	Wind: Mainly NW-NE 1-5 knots, visibility down to 25 metres in fog banks, temperature/dew point -3/-4 °C, QNH 1005 hPa.
Persons on board:	
crew members	1
passengers	0
Injuries to persons	0
Damage to the aircraft	Limited
Other damage	-
The pilot:	
Sex, age, licence	Male, 39 years, PPL(H)
Total flying time	1,650 hours, of which XXX hours on type
Flying hours previous 90 days	36 hours, of which 36 hours on type
Number of landings previous 90 days	~ hours, of which ~ hours on class/type

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The Swedish Accident Investigation Board (SHK) was notified on 11 January 2010 that a helicopter with registration SE-JGA had an accident at 14:37 hours on that day at Näsudden on Ornö island in the Stockholm archipelago, Stockholm county.

The accident is investigated by SHK represented by Carin Hellner, Chairperson, Agne Widholm, chief operations investigator, and Staffan Jönsson, technical investigator.

SHK is also assisted by Anders Ljungkvist as a meteorological expert, Liselotte Yregård as a medical expert, and Peter Gärdehall as an authorised Robinson R44 type technician. Accredited representative Air Safety Inspector Jason Aquilera from NTSB is also involved.

The investigation is followed by Ulrika Svensson, Swedish Transport Agency.

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<sup>1</sup> ARC: Airworthiness Review Certificate

## General

The Swedish Accident Investigation Board (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 so far as possible to determine both the sequence of events and the cause of the events, along with the damage and effects in general. An investigation shall provide the basis for decisions which are aimed at preventing similar events from happening again, or to limit the effects of such an event. At the same time the investigation provides a basis for an assessment of the operations performed by the public emergency services in respect of the event and, if there is a need for them, improvements to the emergency services.

SHK accident investigations try to come to conclusions in respect of three questions: *What happened? Why did it happen? How can a similar event be avoided in future?*

SHK does not have any inspection remit, nor is it any part of its task to apportion blame or liability concerning damages. This means that issues concerning liability are neither investigated nor described in association with its investigations. Issues concerning blame, responsibility and damages are dealt with by the judicial system or, for example, by insurance companies.

The task of SHK does not either include as a side issue of the investigation that concerns emergency actions an investigation into how people transported to hospital have been treated there. Nor are included public actions in the form of social care or crisis management after the event.

The investigation of this aviation incident is taking place in accordance with Regulation (EU) No. 996/2010 concerning the investigation and prevention of accidents and incidents in civil aviation. The application and procedures in respect of the performance of such investigations are also in accordance with Annex 13 of the Chicago convention.

According to Article 16.7 of the EU Regulation, the investigatory safety authority shall, one year after the accident or incident, release a preliminary statement, in cases where the final report has not been published after 12 months has elapsed.

The statement is to contain – apart from a review of the sequence of events – information concerning the progress of the investigation along with parts of the factual material that has been assembled in relation to the case. Publication of the preliminary statement takes place during a phase wherein the collection of facts has not been completed, so that the content of the material presented herein may be supplemented, altered or left out of the final report.

Against the background of the present review, SHK cannot guarantee that everything in this preliminary statement will be included in – or be identical to – the content of the final published report of the events.

# 1 FACTUAL INFORMATION

## 1.1 History of the flight

The pilot decided on that particular day to fly out to Ornö island in the Stockholm archipelago. The pilot checked the weather and understood that it would be good, with no limitations. The helicopter was rolled out of a hangar at Bromma airport after a daily inspection and the engine started to warm up, then hover-taxed down to the fuel station for filling up with fuel. The flight began at 14:15, first towards Karlslunds Marina at Gälö in clear weather and almost a dead calm.

After flying past Karlslunds Marina the pilot observed some sea mist that was coming out of the fairway towards Dalarö, where the water was not ice-covered. The pilot passed through the sea mist at a speed of about 70 knots and at a flight altitude of about 1,000 feet, descending for an approach to a private helicopter platform at Torsnäsudd, Ornö. When the pilot had passed the fairway he was met by a fog bank which made it impossible for him to obtain any external references. He then tried to turn back out of the fog bank but became disoriented and wanted to avoid flying into higher terrain and trees near to the intended landing location. He then decided to descend towards the water surface in order to establish a reference. Due to the very dense fog that was present he did not observe the water surface. The skids and rotor disk then touched the water, whereupon the entire helicopter began to shudder and then laid on its right side in the water.

The pilot activated the emergency floats, which inflated after a few seconds and provided flotation. He then opened the left door and climbed out of the helicopter, got on to the pontoon and the underside of the fuselage. By this time the helicopter was upside down in the water. The pilot was soaked to the waist and by means of his mobile telephone could call SOS-Alarm via the 112 number, which he did at the time 14:37.

There was a Swedish Sea Rescue Society hovercraft in the area which headed towards the accident location in order to rescue the pilot, but because of the thick fog found it difficult to find him. Finally the hovercraft was able to find the distressed pilot and rescue him. The pilot escaped unhurt but was suffering from hypothermia. The helicopter was retrieved by SHK the same day.

The accident took place at position 59° 04' N 18° 21' E; at sea level.

## 1.2 Injuries to persons

	Crew members	Passengers	Others	Total
Fatal	–	–	–	–
Serious	–	–	–	–
Minor	–	–	–	–
None	1	–	–	1
Total	1	–	–	1

## 1.3 Damage to the aircraft

Visual inspection of the helicopter after it had been salvaged showed a limited amount of damage. Both the main rotor blades were deformed and one of the blades had a stability failure. The tail boom had a torsion fracture on the top and right side in the registration area, and the fuselage had minor

deformations in the skin on the right side and underneath. The aerodynamic fairings at the front “cross tubes” had severe deformation, on the right hand side had a more widespread area of damage. A more detailed examination of the damage in a hangar showed that the tail rotor drive shaft had a torsion fracture behind the Thomas coupling at the joint plane between the tail boom and fuselage. The disc between both drive shafts was also deformed. The rivets in the fairing skin in the transition between the tail boom and the engine were sheared. Several of the panels forming the outer skin at the bottom of the helicopter were permanently deformed. In addition it was found that the cooling fins located furthest out on the sides behind the silencer had been fitted incorrectly, the left side fin being installed at the right side and vice versa.

#### 1.4 Other damage

Not applicable

#### 1.5 The crew

##### 1.5.1 The pilot

The pilot was 39 years old at the time and had a valid PPL (H) Licence.

#### 1.6 The aircraft

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The aircraft	
Type certificate holder	Robinson Helicopter Company
Type	R44
Serial number	0673C
Year of manufacture	1999
Gross mass	Max. authorised take-off/landing mass 1,090 kg, actual 895 kg
Centre of gravity location, cm	254,3
Total flying time	1361.8 hours
Flying time since latest periodic inspection (100 flying hours inspection)	39.9 hours
Fuel loaded before event	AVGAS 100LL

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<i>Engine</i>	
Type certificate holder	Lycoming Engines
Engine model	O-540-F1B5
Number of engines	1
Engine	<i>No. 1</i>
<i>Total operating time, hrs</i>	1361.8
Operating time since overhaul	<i>39.9</i>

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<i>Rotor</i>	
Manufacture	Robinson
Operating time since latest overhaul	Running time for inspection not achieved
Main rotor	1361.8 hours
Tail rotor	1361.8 hours

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The aircraft had a Certificate of Airworthiness with approval certificate (ARC – Airworthiness Review Certificate) valid until 15 July 2010.

## 1.7 Meteorological information

### 1.7.1 General

From an area of high pressure centred on the south of Norway a weak high pressure ridge stretched eastwards over eastern Svealand, southern central Sweden. There was a band of low cloud and/or fog over the Baltic Sea parallel to the coast during the morning which during the afternoon extended over land, see the Nordic SWC<sup>2</sup> at 12:00 UTC.

### 1.7.2 Observed weather

There was a pronounced temperature inversion in the area. An AIREP<sup>3</sup> from Stockholm/Arlanda at 10:50 UTC gave the following temperature values:

1500 ft: 0° C

1000 ft: -2° C

Ground level: -13° C

METAR Bromma

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ESSB 111250Z 23001KT CAVOK M09/M10 Q1030 3072//59
ESSB 111320Z 24003KT 9999 FEW004 M09/M11 Q1030 3072//59
ESSB 111350Z 22003KT 9999 FEW004 M10/M11 Q1030 3072//59
ESSB 111420Z 24002KT 9999 SCT003 M11/M13 Q1030 3072//60
ESSB 111450Z 25002KT 9999 SCT003 M12/M13 Q1030 3072//60
ESSB 111520Z 27002KT 6000 BR BKN003 M11/M12 Q1030 3072//60
ESSB 111550Z 29002KT 4000 BR BKN002 M11/M12 Q1030 3072//64

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METAR is a meteorological observation in coded format that is normally reported twice every hour. The table above gives the information that several small areas (FEW = 1-2/8) of low cloud at 400 feet had moved in between 12:50Z and 13:20Z.

These thickened to SCT (3-4/8) between 13:50Z and 14:20Z, and then further to BKN (7-8/8), also descending to 200 feet by 15:50Z.

At the accident site the wind was primarily NW-NE 1-5 knots, temperature/dewpoint -3/-4°C, QNH 1030 hPa. Fog occurred in banks which came and went. The hovercraft crew stated that visibility was no more than 25 metres when they arrived at the accident.

### 1.7.3 Forecasts

The area forecast that was issued at 11:00 UTC was as follows for the area around Ornö (Area B southern part, area 1A).

The forecast applied to 11 January 2010 between 11:00 and 17:00 UTC.

No turbulence was expected during that period.

Ice condition

During the whole period there would be light to moderate icing in cloud.

<sup>2</sup> SWC – Significant Weather Chart

<sup>3</sup> AIREP – Weather information reported from a pilot



**Visibility/Weather/Clouds**

During the whole period, visibility greater than 20 km, locally less than 3000 metres in granular snow. Cloud base 500-1000 feet, locally below 500 feet.

**Zero degrees isotherm**

Zero degrees at the surface (SFC), zero degrees between 1500 and 2500 feet  
Local ground inversion occurring

**Wind at ground level**

NE 10-20 knots

**Wind and temperature**

2000 ft: 070/15 +00

**Lowest QNH**

1028, lowest in the south

On the Nordic SWC at that time (applicable to 12:00 UTC, issued at 10:30 UTC) a dashed line is clearly marked, running from Arlanda towards Södertälje. This line marked the area with visibility of less than 5 km and/or cloud at less than 1000 feet. Just outside the Stockholm archipelago there is a mist symbol (visibility 1-10 km) and in addition BKN 003/020, i.e. 5-7/8 cloud (Stratus) with a cloud base at 300 ft. The fact that there would be reduced visibility and low cloud was therefore well predicted. Symbols for light icing were also present in the same area.

The applicable TAF<sup>4</sup> for Bromma that was issued at 11:30 UTC read:

ESSB 11130Z 1112/1121 30003KT 9999 FEW003 TEMPO 1112/1121 BKN003

The forecast for Stockholm/Bromma airport showed that during the whole forecast period from 12:00 UTC to 21:00 UTC there would be broken low cloud (BKN) with a cloud base at 300 feet.

**1.8 Aids to navigation**

Not applicable.

**1.9 Radio communications**

Not applicable.

**1.10 Aerodrome information**

Not applicable.

**1.11 Flight recorders and voice recorders**

Not present and not required.

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<sup>4</sup> TAF – An airport forecast, which in the case of Stockholm/Bromma is usually issued every three hours, and is applicable to the subsequent 9 hours.

## 1.12 Medical information

Nothing indicates that the mental and physical condition of the pilot was impaired before or during the flight.

### **Measures taken**

SHK has gathered the relevant facts from that particular flight and rescue efforts. In addition a technical examination of the aircraft has been performed. SHK finally directed the investigation into obtaining and reviewing the actual flying weather and the applicable forecasts for the area.

SHK has found that the issued forecasts which were available before take-off predicted that the visibility and cloud base would be below the applicable minima for private helicopter flying, which are 3000 m visibility and a cloud base threshold of 500 feet.

### **Timetable**

SHK has completed gathering the facts and the remaining work is directed towards analysis and completion of the report. This work is expected to be completed during the first half of 2011.