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Report RL 2001:24e

Accident involving helicopter SE-HPO at Kåsjön, Partille, O County, Sweden on the 17th of January 2001

Case L-012/01

SHK investigates accidents and incidents with regard to safety. The sole objective of the investigations is the prevention of similar occurrences in the future. It is not the purpose of this activity to apportion blame or liability.

The report is also available on our Website: www.havkom.se

Translated by Dennis Lynn Anderson
From the original Swedish at the request of the Board of Accident Investigation.

In case of discrepansies between the English and the Swedish text, the Swedish text is to be considered the authorative version.

2001-08-24 L-012/01

Swedish Civil Aviation Administration

601 79 NORRKÖPING

Report RL 2001:24e

The Board of Accident Investigation (Statens haverikommission, SHK) has investigated an accident that occurred on the 17th of January 2001 at Kåsjön, Partille, O County, Sweden, involving a helicopter with registration SE-HPO.

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

A translation to English of the report is enclosed.

Ann-Louise Eksborg

Monica J Wismar Henrik Elinder

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L-012/01
Report finalized 2001-08-24

Aircraft: registration, type	**SE-HPO,** Bell 206L-1
Class/airworthiness	Normal, valid certificate of airworthiness
Owner/Operator	The National Police Board, Box 12256, 102 26 Stockholm
Date and time	The 17th of January 2001 at 21:10 hrs. during darkness *Note:* All times in the report refer to Swedish Standard Time = UTC + 1 hour
Place of occurrence	Kåsjön, Partille, O County, Sweden, (position 5742N 01208E, 109 meters above sea level)
Type of flight	Utility aviation
Weather	According to SMHI's (Swedish Meteorological and Hydrological Institut) analysis: wind approximately 090°/03 knots, visibility 8 km in haze, overcast with the cloud-base at approximately 1,500 feet, temp./dewpoint –2/–3 °C, QNH 1027 hPa.
Persons onboard: crew	1
passengers	3
Injuries to Persons	None
Damage to aircraft	Slightly damaged
Collateral damage	Damaged birch tree
The pilot:	
age, certificate	40 years old, Commercial Helicopter License with Night Rating (Swedish BH)
total flying time	3,472 hours, of which approximately 2,600 on the type
flying hours previous 90 days	49 hours, all on the type
number of landings previous 90 days	75

The SHK was notified on the 5th of February 2001 that an accident involving a helicopter with registration SE-HPO had taken place at Kåsjön, Partille, O County, Sweden, on the 17th of January 2001 at 21:10 hrs.

The accident has been investigated by SHK, represented by Ann-Louise Eksborg, Chairman, Monica J Wismar, Chief Investigator Flight Operations, and Henrik Elinder, Chief Technical Investigator Aviation.

The investigation has been followed by the Swedish Board of Civil Aviation through Gun Ström.

Summary

The pilot took off from Gothenburg /Säve together with an assistant, who had no flying ability. They were about to search for a person reported missing after ice-skating at Kåsjön east of Gothenburg.

They found a hole in the ice, which they thought should be investigated more closely by a dog team, which was in the vicinity of the lake.

The shoreline along this part of the lake didn t provide a suitable landing spot for the helicopter. With the assistance of the searchlight, they found a small wooden bridge, that the pilot thought should be able to be used to board the dog team. He slowly hovered forward to the outer portion of the bridge and placed the left-hand landing skid on the bridge so that the dog team could be taken onboard. In the searchlight beam he saw that the shoreline was overgrown with birch saplings but he judged that the safety margin to the rotor disk area was at least 1½ meters. He was aware that the distance was less than applicable safety distance, which is three meters.

When the assistant had closed the left rear door and had boarded, the pilot heard and felt that the main rotor came in contact with some branches to the left of the helicopter. Because of the precarious lighting situation, the pilot didn t dare to look to the left, instead he concentrated on slowly hovering to the right. However, he considered the rotor contact with the tree to be of a minor nature and didn t notice anything abnormal concerning the maneuvering of the helicopter.

After landing it was found that the rotor blades had been damaged to such an extent that he didn t consider it suitable to fly any further with the helicopter.

The flight placed large demands on the pilot.

In connection with landing, the pilot went below the applicable minimum safety distance to the nearest obstacle and in the darkness, also probably misjudged the actual distance. The result of this was that the main rotor collided with a tree.

Recommendations

None

1 FACTUAL INFORMATION

1.1 History of the flight

The pilot was on emergency standby in his home and was called by the SOS Emergency Center just before 18:00 hrs. on the evening of the 17th of January 2001. Assistance was required to search for a person who was reported missing after he had been ice-skating on Kåsjön east of Gothenburg. The pilot, who knew the area well, accepted the mission.

Before departure, the pilot mounted an extra searchlight of type SX-5 onto the helicopter's ordinary searchlight. Both searchlights can be maneuvered vertically and horizontally from the pilot position. Thereafter the pilot took off from Säve airport at 19:25 hrs. together with an assistant, who had no flying ability. After take off, the pilot discovered that the helicopter's ordinary searchlight had jammed in a forward/upward beam direction. In spite of this, he judged that the mission could still be accomplished, because the extra searchlight was functional.

When they reached Kåsjön, the pilot made a flyby at an altitude of 800–1,000 feet above the area in order to localize eventual obstacles to flight operations and to possibly locate any holes in the ice. Thereafter he decreased speed and altitude and started to hover clockwise around the edge of the water and search with the maneuverable searchlight.

After a few minutes of searching they discovered a fresh hole in the ice. They saw footprints by the hole and on a large flat area of rock by the shore, which could be interpreted as though a person had recently pulled himself or herself out of the hole. The pilot temporarily left the assistant at the site, while he departed the area to pick-up a team of police search and rescue dogs that were in the vicinity. After he delivered the dog team and took the assistant back onboard again, they continued the search along the shoreline. A while later they found another hole in the ice which they thought should be investigated more closely by a second dog team, which also was in the vicinity of the lake.

However, the shoreline along this part of the lake didn't provide a suitable landing spot for the helicopter. The ice wasn´t considered to be solid enough to be able to land on.With the assistance of the searchlight, they found a small wooden bridge, that the pilot thought should be able to be used to board the dog team. He slowly hovered forward to the outer portion of the bridge and placed the left-hand landing skid on the bridge so that the dog team could be taken onboard. In the searchlight beam he saw that the shoreline was overgrown with birch saplings but he judged that the safety margin to the rotor disk area was at least 1½ meters. He was aware that the distance was less than applicable safety distance, which is three meters. During this hovering, the area in front of the helicopter was illuminated by the searchlight while the areas to the sides were in almost total darkness. The pilot kept looking forward towards the illuminated area in order to have external visual reference.

The pilot felt that the boarding of the dog team took a lot of time. When the assistant had closed the left rear door and had boarded, the pilot heard and felt that the main rotor came in contact with some branches to the left of the helicopter. Because of the precarious lighting situation, the pilot didn't dare to look to the left, instead he concentrated on slowly hovering to the right. However, he considered the rotor contact with the tree to be of a minor nature and didn't notice anything abnormal concerning the maneuvering of the helicopter.

After the second dog team had been delivered, the pilot and his assistant flew to a point of foot-search initiation, which the police had established, landing there at approximately 21:20 hrs. to report for duty. In connection with that ground stop, the pilot performed a visual check of the helicopter. At this time he determined that the rotor blades had been damaged to such an extent that he didn't consider it suitable to fly any further with the helicopter.

The accident took place at position 5742N 01208E; 109 m above sea level.

1.2 Injuries to persons

	Crew	*Passengers*	*Others*	*Total*
Fatal	–	–	–	–
Serious	–	–	–	–
Minor	–	–	–	–
None	1	3	–	4
Total	1	3	–	4

1.3 Damage to aircraft

Limited.

1.4 Other damage

Damaged birch tree.

1.5 The pilot

The pilot was 40 years old at the time and had a valid Commercial Helicopter License with Night Rating (Swedish BH). The pilot had experience level G (green) with an operational weather limitation of 1 km visibility and 250 foot cloudbase.

Flying time (hours)

previous	*24 hours*	*90 days*	*Total*
All types	1.6	49	3,472
This type	1.6	49	2,600

Number of landings this type the previous 90 days: 75.
Flight training on the type concluded in November 1989.
Latest periodic flight training (PFT) was carried out on the 7th of November 2000 on the Bell 206.

The pilot has stated that the hovering maneuver with the skid placed on the bridge, was not experienced as especially difficult or demanding, but he felt an incipient irritation about the extended time it took to board the dog team.

1.6 Aircraft information

GENERAL

Manufacturer:	Bell
Type:	206 L-1
Serialnumber:	45533
Year of manufacture:	1980
Gross weight:	Maximum authorized 1,837 kg, actual approximately 1,750 kg
Center of gravity:	Within allowable limits
Total flight hours:	15,505 hours
Flight hours since last periodic check:	47 hours
Fuel uplifted before event:	JET A1

ENGINE

Manufacture:	Allison
Model:	250 C-30P
Number of engines:	1
Compressor hours/cycles since overhaul:	2,698/2,568
Turbine hours/cycles since overhaul:	1,741/1,654

ROTOR

Rotor manufacturer:	Bell
Rotor operating time since complete overhaul:	2,465.2 hours

The helicopter had a valid certificate of airworthiness.

1.7 Meteorological information

General weather report from the Gothenburg area was high pressure with light winds, cloudy with light haze.

According to SMHI's analysis: wind approximately 090°/03 knots, visibility 8 km, haze, overcast with the cloud base at approximately 1,500 feet, temp./dewpoint –2/–3 °C, QNH 1027 hPa.

1.8 Aids to navigation

Not applicable.

1.9 Communications

The crew maintained radio contact with search and rescue command in the area.

1.10 Aerodrome information

Not applicable.

1.11 Flight recorders

There was no requirement to carry a Flight Data Recorder (FDR) or a Cockpit Voice Recorder (CVR) on board the aircraft and neither was fitted.

1.12 Accident site and aircraft

1.12.1 Accident site

The collision with the tree occurred by a bridge at the southern shore of the lake. The picture below is taken from the direction of approach a few days after the accident. The tree in question was a birch that stood close to the water's edge. Its bark was darker than that of the surrounding trees and it was leaning out over the water. The diameter of the tree was three centimeters.

1.12.2 Aircraft

The tips of both rotor blades were damaged by the collision with the tree.

1.13 Medical information

Nothing indicates that the mental or physical condition of the pilot had been impaired prior to or during the flight.

1.14 Fire

There was no fire.

1.15 Survival aspects

Not applicable.

1.16 Tests and research

Not applicable.

1.17 Organizational and management information

The Flight Operations Division of The National Police Board operates a special type of commercial air traffic. The operation includes, among other things, operational flights during police missions, search and rescue and traffic and forest fire surveillance.

The National Police Board flight operations is based in Malmö, Gothenburg, Tullinge and Boden.

According to the operations safety directives, the safety clearance between the rotor-disk area and the nearest obstacle is a minimum of three meters.

2 ANALYSIS

This was an urgent mission involving the co-operation of the flight and ground patrols in possibly saving lives. The helicopter was needed both for the search for persons and for transporting the dog teams around the lake (Kåsjön). The flight placed large demands on the pilot and meant that the helicopter was partially to be flown at low altitude in darkness and that several landings was to be made, in an area with few external visual references except those that were illuminated by the helicopters searchlight. The ice wasn t solid enough to be able to land on and the number of possible landing sites around the lake was limited.

There was a need to accomplish the landing in question but there were not any suitable landing spots in the vicinity. When the pilot decided to land on the edge of the bridge, he was aware that this would be carried out with a deviation from the valid minimum distance of three meters to the nearest obstacle. However he judged the distance, which he estimated to be approximately 1½ meters, to be sufficient.

During the hovering maneuver, when the helicopter had one of its landing skids on the bridge and the other one in the air, a lateral movement ensued when the passengers boarded. During the extended boarding time the helicopter most likely started to drift sideways; far enough to the left that the scanty safety distance would be used-up and the main rotor collided with the nearest tree.

The collision with the tree by the bridge at the time of the hovering maneuver shows how difficult it is to judge distance in the dark. In this case the actual distance to the nearest tree was most likely less than a meter. Contributing to the misjudgment could have been that the bark of the actual tree was darker than that of the trees nearby and that it was leaning out over the water.

In the case in question, the collision with the tree resulted only in material damage to the helicopter, but could have had catastrophic consequences had the rotor blades been sheered off. This occurrence shows the importance of relevant safety margins being stipulated in applicable regulations and that these are always understood and followed by all persons involved.

3 CONCLUSIONS

3.1 Findings

a) The pilot was qualified to perform the flight.
b) The helicopter had a valid certificate of airworthiness.
c) The mission placed large demands on the pilot.
d) During preparation for landing, the pilot probably overestimated the distance to the nearest obstacle.
e) At the time of the landing the pilot was aware that he was operating below the applicable safety distance to the nearest obstacle.

3.2 Causes

In connection with landing, the pilot went below the applicable minimum safety distance to the nearest obstacle and in the darkness, also probably misjudged the actual distance. The result of this was that the main rotor collided with a tree.

4 RECOMMENDATIONS

None.