Statens haverikommission

Accident with a helicopter at Enköping/Långtora Airport

The Swedish Accident Investigation Authority has investigated an accident with a helicopter of the model 369E with registration SE-JVM at Enköping/Långtora Airport, Uppsala County, on November 18, 2024.

13 November 2025

Final report

SHK 2025:18e

About the Swedish Accident Investigation Authority

The Swedish Accident Investigation Authority (SHK) investigates accidents and incidents from a safety perspective regardless of whether they occurred on land, at sea or in the air. The authority's accident investigations are intended to disseminate knowledge and provide a basis for actions by authorities, companies, organizations, and individuals that improve safety and reduce the risk of accidents. The activities should also contribute to people feeling secure and having trust in society's institutions and the confidence in transportation systems. The mission also includes assessing the efforts made by the rescue services in connection with an accident. However, the investigations should not assign blame or liability, whether criminally, civilly, or administratively.

The investigations by SHK aim to answer three questions:

- What happened?
- Why did it happen?
- How can a similar accident/incident be avoided in the future?

Investigations of aviation accidents and incidents are primarily regulated by Regulation (EU) No 996/2010 on the investigation and prevention of accidents and incidents in civil aviation and the Act (1990:712) on the investigation of accidents. The investigations are conducted in accordance with Annex 13 of the Chicago Convention.

The report is also available on the Swedish Accident Investigation Authority's website: www.shk.se.

ISSN 1400–5719

File number: L-126/24

Content

Summary

The purpose of the flight was to carry out an inspection of power lines. The flight was the second of the day and it was preceded by a refuelling stop at Enköping/Långtora Airport. The crew consisted of a pilot and a system operator. The helicopter was parked on a grassy area outside a hangar with its nose towards the east. The take-off weight was 2,811 lbs. The weather at the location was clear and sunny, with a south-westerly wind.

After the engine was started, the helicopter hovered up to just above ground level. In connection with the hover, the helicopter began to rotate clockwise. The pilot was unable to stop the rotation despite using full pedal travel. The helicopter rotated while rising to a height of approximately 15 metres before descending during rotation and hitting the ground. The crew got out of the helicopter with the help of witnesses who were at the scene. Those on board suffered minor injuries.

Rescue services, police, ambulance and an ambulance helicopter were called to the scene. Both crew members were taken to hospital for examination and treatment.

No unusual sounds, warnings or malfunctions were perceived by the crew before the rotation began. The pilot has also stated that he perceived the wind to be coming from the front during take-off and hover.

The technical investigations conducted have not identified any faults that could have contributed to the accident.

Causes of the accident

During take-off, the helicopter operated at high power output and a relatively high take-off weight. The relative wind was coming from the rear on the right side, which contributed to the helicopter's fin acting like a weather vane. These conditions likely exceeded the tail rotor's thrust capacity, resulting in an unanticipated right yaw that developed into an uncontrolled rotation.

Contributing factors:

The pilot's perception that the wind was coming from the front likely contributed to the yaw being unexpected.

Safety recommendations

None.

The investigation

SHK was informed on 18 November 2024 that an accident involving a helicopter with the registration SE-JVM had occurred at Enköping/Långtora Airport, Uppsala County, at 10.52 hrs on the same day.

The accident has been investigated by SHK represented by Mr Jonas Bäckstrand, Chairperson, Mr Stefan Carneros, Investigator in Charge and Operations Investigator until 30 April 2025, Mr Tony Arvidsson, Technical Investigator until 30 April 2025 and then also Investigator in Charge, and Mr Ola Olsson, Operations Investigator from 30 April 2025.

Mr Mieczysław Wyszogrodzki has participated as accredited representative on behalf of Poland.

Mr David Bowling has participated as accredited representative on behalf of the United States.

Mr Karl-Axel Eden has participated as an adviser on behalf of the Swedish Transport Agency and Dr. Matthew Hilscher has participated as an adviser on behalf of the European Union Aviation Safety Agency (EASA).

The following organisations have been notified: EASA, the European Commission and the Swedish Transport Agency (Transportstyrelsen).

Investigation material

Interviews have been conducted with the pilot, the system operator, flight operator executives and witnesses of the accident. The accident site and the helicopter have been examined. Special technical examinations have been carried out on the engine, fuel, oil and components. Data from the Visimind measurement system and a navigation application have been obtained and analysed.

A meeting with the interested parties was held on 23 September 2025. At the meeting, SHK presented the facts established during the investigation, available at the time.

Final report SHK 2025:18e

Data	
Aircraft	Registration, type: SE-JVM Model: 369E Class, Airworthiness: Normal, Certificate of Airworthiness and Valid Airworthiness Review Certificate (ARC)[1] Operator: First European Aviation Company Sp. z o.o.
Time of occurrence:	18 November 2024, 10.52 hrs in daylight Note: All times are given in Swedish standard time (UTC[2] + 1 hour)
Place	Enköping/Långtora Airport, Uppsala County, (position 59˚44'45N 17˚08' 42 E, 12 metres above mean sea level)
Type of flight	Specialised operations (SPO)
Weather	According to SMHI's analysis: wind 240º/7 knots, visibility >10 kilometres, no clouds, temperature/dewpoint +1/-5 ˚C, QNH[3] 991 hPa
Persons on board	In total: 2 Crew members including cabin crew: 2
Injuries	To persons: 2 Damage to aircraft: Substantially damaged Other damage: Fuel leakage at accident site
The pilot:	Age: 51 years Licence: CPL(H)[4] Total flying hours: 5 974 hours, of which 405 hours on type Flying hours previous 90 days: 112 hours, of which 48 hours on type Number of landings previous 90 days: 64 hours, of which 29 hours on type
The System Operator	No flight operational tasks

[1] ARC (Airworthiness Review Certificate).

[2] UTC (Coordinated Universal Time).

[3] QNH (The atmospheric pressure adjusted to the mean sea level).

[4] CPL (Commercial Pilot License).

1. Factual information

1.1 History of the flight

1.1.1 Preconditions

The purpose of the flight was to carry out an inspection of power lines. The flight was the second of the day and it was preceded by a refuelling stop at Enköping/Långtora Airport. The helicopter was equipped with a system that diagnoses the power lines, see Figure 1. The crew consisted of a pilot and a system operator. The pilot operated the helicopter from the seat on the left side, and the system operator was seated on the right side. The controls on the right side, where the system operator was seated, had been removed. The helicopter was parked on a grassy area outside a hangar with its nose towards the east. Before the flight, a pre-flight inspection was carried out without any remarks. The take-off weight was 2,811 lbs, according to the load chart. The weather at the location was clear and sunny, with a south-westerly wind.

Figure 1. The helicopter just before take-off. The measuring equipment is marked with a dashed rectangle. Person masked and marking added by SHK. Photo: Private person.

1.1.2 History of the flight

After the engine was started, the helicopter hovered up to just above ground level. In connection with the hover, the helicopter began to rotate clockwise. The rotation speed gradually increased and the pilot was unable to stop the rotation despite using full pedal travel, as he has later stated. The helicopter rotated while rising to a height of approximately 15 metres before descending during rotation. The helicopter struck the ground with its main rotor blades and the left main landing gear. The helicopter rotated a total of six times before coming to rest on its left side. The windows were shattered upon impact, and the crew exited through the openings on the left side.

According to the pilot and the system operator, no unusual sounds, warnings or malfunctions were perceived before the rotation began. The pilot has also stated that he perceived the wind to be coming from the front during take-off and hover.

The accident occurred at position 59˚44'45N 17˚08' 42E, 12 metres above mean sea level.

1.1.3 Additional information

One of the witnesses of the accident has been interviewed and has stated the following.

The witness, who observed the accident, was standing in front of the hangar and saw the helicopter hovering low above the ground with the nose of the helicopter pointing east. Shortly afterwards, the helicopter began to rotate clockwise as it gained altitude. The rotation increased as the helicopter gained altitude. After a number of revolutions, the nose began to point downward and the helicopter descended while rotating until it hit the ground. Several witnesses to the accident went to the helicopter to check the status of the crew.

1.2 Injuries to persons

Those on board suffered minor injuries.

1.3 Damage to aircraft

Substantially damaged.

1.4 Other damage

1.4.1 Environmental impact

Approximately 160 litres of Jet A-1 aviation fuel leaked in connection with the accident. The ground was cleaned up following consultation with the municipality's environmental officer.

1.5 Personnel information

1.5.1 -The Pilot

Commander

The commander, was 51 years old and had a valid CPL(H) license, including flight operational and medical eligibility.

Flying hours - latest	24 hours	7 days	90 days	Total
All types	4	10	112	5 974
Actual type	4	10	48	405

Number of landings actual type previous 90 days: 29.
Type rating concluded on 18 April 2023.
Latest PC[5] (proficiency check) conducted on 10 April 2024 on type.

[5] PC (Proficiency Check).

1.5.2 System operator

The system operator was not tasked with operating the helicopter, but has stated that he had approximately 1,500 hours of total flight time as a system operator.

1.6 Aircraft information

The helicopter is 9.4 metres long and 2.7 metres high up to the main rotor. Its width corresponds to the diameter of the main rotor, which is just over 8 metres.

The helicopter was equipped with measuring equipment installed in the back seat. Additional equipment was mounted on a beam attached to the underside of the helicopter.

1.6.1 Helicopter

Helicopter	
TC-holder	MD HELICOPTERS, LLC
Model	369E
Serial number	0562E
Year of manufacture	2001
Gross mass, lbs	Max start/landing mass suspended load 3 000, current 2 811
Centre of gravity	Within limits.
Total flying time, hours	6 668
Flying time since latest inspection	24
Type of fuel uplifted before the occurrence	Jet A-1

Engine	
TC-holder	ROLLS-ROYCE CORPORATION
Type	250-C20B
Number of engines	1
Serial number	834285
Total operating time, hours	6 155
Operating time since overhaul, hours	324

Deferred remarks
None relevant to the event.

The helicopter had a Certificate of Airworthiness and a valid ARC.

1.6.2 Rotor system

The main rotor of this type of helicopter rotates counterclockwise when viewed from above. The rotation generates torque in the opposite direction, which in this case is to the right. The torque effect is most noticeable during high power output combined with low airspeed. To counteract the torque produced by the main rotor, the tail rotor generates thrust in the opposite direction, see Figure 2. The thrust of the tail rotor is adjusted by pedal movements, which change the angle of the rotor blades.

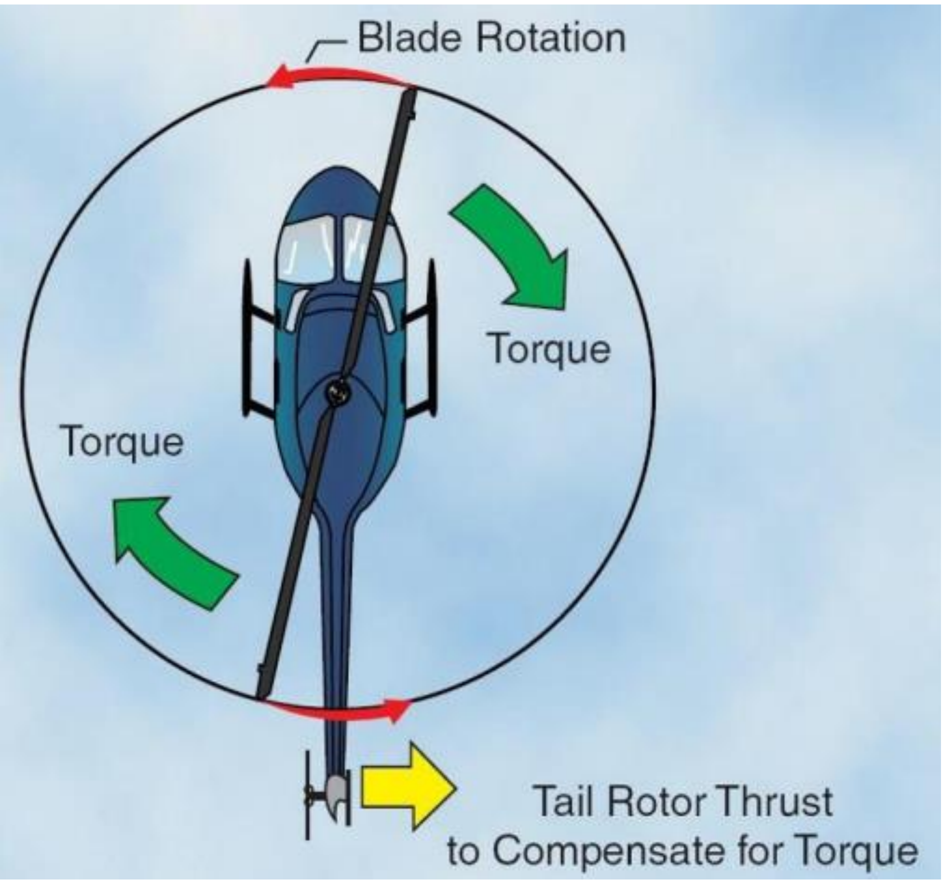

Figure 2. Schematic image showing the direction of rotation of the main rotor blades and the torque generated, as well as the opposing thrust from the tail rotor. Source: Federal Aviation Administration (FAA).

1.6.3 Low speed maneuvering

The helicopter's flight manual states that maneuvers that exceed the tail rotor's thrust capacity should be avoided.

Conditions that can approach or exceed the tail rotor’s thrust limits include high density altitude, high gross weight, rapid pedal turns, and operating the helicopter in a downwind condition. These factors may cause the required thrust to surpass the tail rotor’s capacity.

1.7 Meteorological information

According to SMHI's analysis of the conditions at Långtora/Enköping Airport: Wind 240°/7 knots, visability >10 kilometres, no clouds, temperature/dewpoint +1/-5 °C, QNH 991 hPa.

1.8 Aids to navigation

Not relevant.

1.9 Communications

Not relevant.

1.10 Aerodrome information

Enköping/Långtora Airport is intended for gliders and has two grass runways designated 07/25 and 12/30. Prior permission is required for single landing permits. There are two wind socks at the airport and at the southern end of the airport there are hangars and parking lots, see Figures 3 and 4.

Figure 3. The airport. Hangars marked with a dashed circle by SHK. Source: KSAB Swedish Airports.

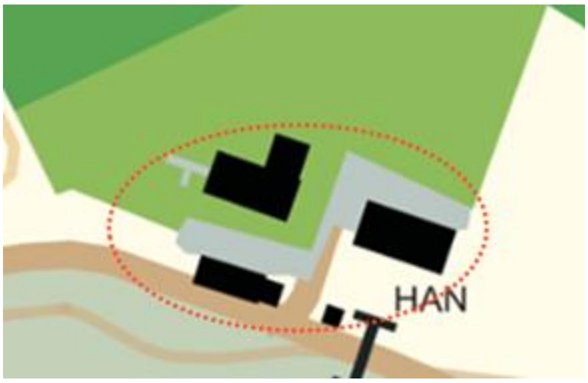

Figure 4. The hangars at the southern end of the airport, marked with a dashed circle by SHK. Source: KSAB Swedish Airports.

1.11 Flight recorders

1.11.1 Flight recorders

There were no requirements for flight or sound recorders. However, a tablet on board contained a navigation application which recorded data from the flight. The Visimind measurement system, which was installed on board to document the status of power lines, recorded data including longitudinal and angular accelerations as well as GNSS[6]-data. SHK has analysed the available data.

The Visimind system, used for the inspection of power lines, employs several sensors. Data from these sensors have been analysed by SHK to assess movements and accelerations. This analysis determined, among other findings, that the helicopter completed six full rotations after take-off, with the angular velocity gradually increasing and the rotation occurring in the same direction throughout, see Figure 5.

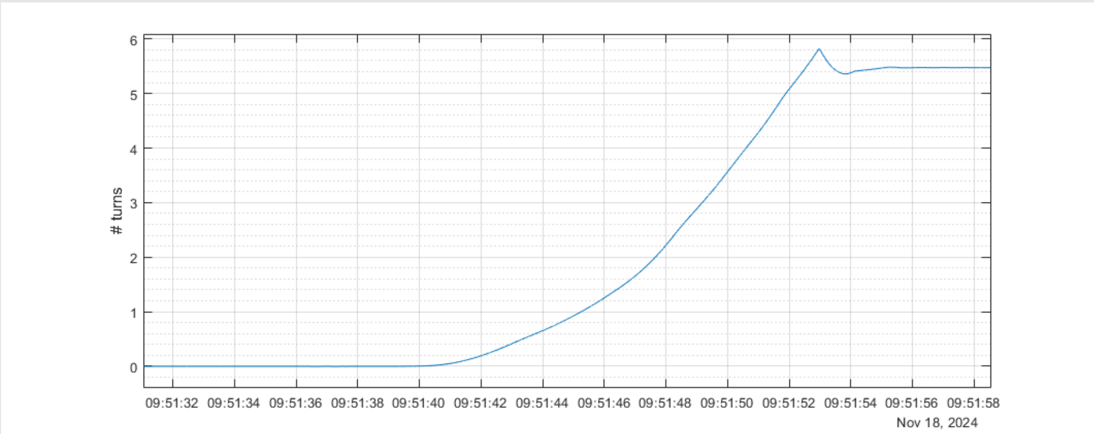

Figure 5. Number of rotations of the helicopter as a function of time.

1.12 Accident site and aircraft wreckage

1.12.1 Accident site

The accident occurred on a grassy area directly adjacent to an asphalt surface outside an aircraft hangar, see Figure 6.

Figure 6. Accident site marked with yellow icon. Image: Google Earth. Marking added by SHK.

[6] GNNS (Global Navigation Satellite System).

Figure 7 shows the accident site from a closer distance, with the helicopter's position and direction at take-off indicated by a helicopter icon. The impact site is marked with a triangle.

Figure 7. Principal sketch of the accident site. The helicopter's final position is marked with a red triangle. Image: Google Earth. Markings added by SHK.

1.12.2 Aircraft wreckage

The wreckage was found within an area of 40 times 40 metres.

The marks in the ground indicated where the main rotor blades, left main landing gear and stabiliser struck the ground. Sequential impacts with the ground brought the rotation of the main rotor to a stop. The tail boom sustained significant damage. The damage to the helicopter is shown in Figure 8.

Figure 8. The aircraft wreckage, the damage to the tail boom marked with a circle.

The tail rotor was found five metres northeast of the helicopter, see Figure 9. A pitch arm was found five metres southwest of the helicopter, see Figure 9. Other parts scattered in connection with the accident consisted mainly of parts from the helicopter's window panes. The fuel tank had been damaged in several places and fuel had leaked onto the ground underneath the helicopter. No oil leaks were observed.

Figure 9. The left image shows the tail rotor where it was found. The right image shows one of the tail rotors blades pitch arms, along with a section of a pitch link.

1.13 Medical and pathological information

Nothing has emerged to indicate that the pilot's mental or physical fitness was impaired before or during the flight.

1.14 Fire

There was no fire.

1.15 Survival aspects

1.15.1 Rescue operation

At 10.52, SOS Alarm received a call from a private individual at the scene who had witnessed the helicopter crash. Rescue services, police, ambulance and an ambulance helicopter were called to the scene. At 11.11, the rescue services arrived at the scene, and a few minutes later an ambulance arrived.

When rescue services arrived on the scene, the crew had exited the helicopter with assistance from witnesses. Both crew members had back pain and minor cuts, and were taken to hospital for examination and treatment.

The ELT[7] manufactured by KANNAD was not activated during the accident.

1.15.2 Position of crew and passengers and the use of seat belts

The pilot was seated on the left side, and the system operator was sitting on the right. Both were wearing four-point seat belts and helmets. Both helmets sustained damage, including cracks.

Both crew members sustained minor rib fractures. Neither required hospitalisation for more than a day.

1.16 Tests and research

1.16.1 Technical examination of the helicopter

A technical examination of the helicopter was conducted, revealing the following findings, among others:

- The drive shaft between the main rotor gearbox and the tail rotor gearbox had broken at the point of damage to the tail boom. The rest of the drive system was inspected, and no other abnormalities were detected.
- The main rotor and tail rotor rotated smoothly and without any abnormal noise from the gearboxes. The oil in the gearboxes was without any remarks.
- There was a connection between the pedals and the tail rotor pitch control assembly. A pushrod in the yaw control system was bent at the point of damage to the tail boom, which is believed to have occurred upon impact.
- The fuel was examined and there were no abnormalities.
- The engine and its components were inspected without remarks.
- The engine controls in the cabin were connected to the power turbine governor and the fuel control on the engine.
- Fuel control system pneumatic leak check was performed without any remarks.

Fractographic examination was performed on the damaged drive shaft and other damaged parts of the yaw control system, see further information about these investigations in section 1.16.2.

1.16.2 Fractographic examination of parts from the helicopter

SHK has commissioned Element Technology AB to perform a fractographic examination of parts from the helicopter. The purpose of the examination was to determine, if possible, the failure mode (e.g. overload, fatigue) for the respective damage. Additionally, the examination

[7] ELT (Emergency Locator Transmitter).

aimed to establish whether the tail rotor drive shaft had failed due to torsion or bending force.

The following parts were examined:

- Tail rotor gearbox, see Figure 10.
- Pitch links for the tail rotor blade pitch control, see Figures 10 and 11.
- Rivets that lock the link arm's attachment to the swash plate, see Figures 10 and 11.
- Tail rotor (including the blade pitch arm, the blade at the blade pitch attachment and the hub), see Figure 12.
- Tail rotor drive shaft, see Figures 10 and 12.

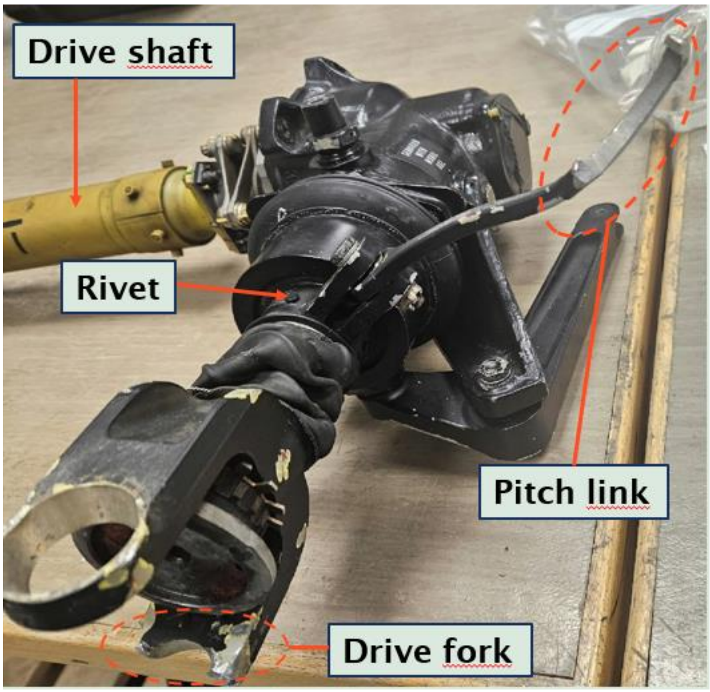

Figure 10. Tail rotor gearbox with damaged parts marked.

Figure 11. The picture on the left shows the damaged pitch links. The pictures on the right shows the damaged rivets. The rivet heads are coming from the inside of the housing.

Figure 12. The picture on the left shows the tail rotor, with the marked area indicating the focus of the examination. The picture on the right shows the broken pitch arm along with a section of the pitch link.

Figure 13. The picture on the left shows the fracture on the section of the drive shaft leading towards the engine. The picture on the right shows the fracture on the section of the drive shaft leading towards the tail rotor gearbox.

The following conclusions can be drawn based on the fractographic examination:

The drive fork, pitch links, rivets and tail rotor (including the pitch arm, the blade at the blade pitch attachment and the hub) have failed as a result of instantaneous ductile overload fracture.

It is not possible to determine failure mode for the tail rotor drive shaft due to damaged fracture surfaces. As the drive shaft has not deformed along its long axis, it is assessed that the tail rotor drive shaft has not failed due to torsion, but to due to bending or buckling.

1.16.3 Engine examination at an authorized maintenance organization

Under the supervision of SHK, an extensive examination and test run of the helicopter's engine were conducted at an authorised aero engine workshop, in collaboration with a representative of the engine's type certificate holder.

The examination of the engine revealed no obvious damage or condition that would prevent it from producing nominal power. The engine started and operated normally, meeting all operational specifications. It produced normal power and responded appropriately to all power demands, including sudden throttle and load changes.

1.17 Organisational and management information

1.17.1 Specialised operations

Specialised operations (SPO) refer to any operation where the aircraft is used for specialised activities such as photography. SPO is regulated by Commission Regulation (EU) No 965/2012 on aviation operations, Annex VIII[8].

[8] Commission Regulation (EU) No 965/2012 of 5 October 2012 laying down technical requirements and administrative procedures related to air operations pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council.

1.17.2 The operator

The operator had an SPO permit issued by the Polish Civil Aviation Authority and was classified as a high-risk commercial operator. The permit covered 16 helicopters of three different types. The operator had six MD369 helicopters, three of which were model 369E. The approval included inspection of power lines.

1.17.3 Operator's safety management system

The operator had a safety management system that was described in a manual called the Management Safety Manual (MSM). The manual also contained a safety policy and information about who was responsible for the safety management system (Safety manager). The safety management system process was described in a diagram, see Figure 14. According to the manual, identified risks were to be risk assessed and documented in a risk register. The operator had identified a specific risk of unanticipated yaw.

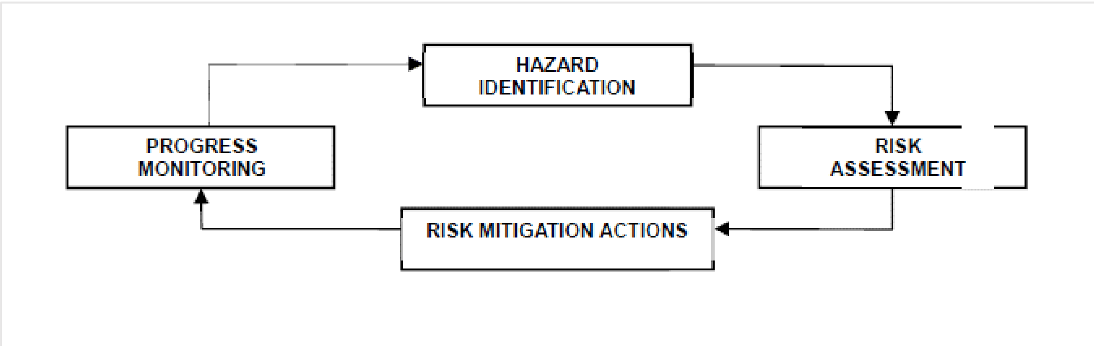

Figure 14. The operator's safety management system process. The diagram is taken from the operators MSM.

1.18 Additional information

1.18.1 Loss of tail rotor effectiveness – unanticipated yaw

Loss of tail rotor effectiveness (LTE) or unanticipated yaw is a known risk in connection with flight at low speed and high-power output.

Unanticipated yaw can be described as a rapid yaw in the opposite direction to the rotation of the main rotor that takes place without any control input by the pilot. The phenomenon is aerodynamic and is not caused by any technical failure, and is instead the result of the tail rotor not being able to provide sufficient thrust to maintain directional control. The phenomenon occurs when the airflow through the tail rotor is disturbed and can happen at airspeeds under 30 knots.

An unanticipated yaw can, if it is not corrected promptly, rapidly turn into uncontrolled rotation that can lead to an accident. Data from flight tests has shown that the tail rotor blades do not stall during an unanticipated yaw. Avoiding unanticipated yaw requires knowledge about the flight conditions that can lead to this phenomenon.

1.18.2 Flight conditions with a risk of unanticipated yaw

For helicopters, there is a risk of unanticipated yaw when flying at low speed in certain conditions, e.g. in connection with relative wind from the tail region.

With wind from the tail region, between 120° and 240°, the helicopter's tail section and tail fin act as a weather vane, causing the helicopter to turn into the wind (weathercock stability) (see Figure 15). This can result in an unanticipated yaw or an increase of yaw rate.

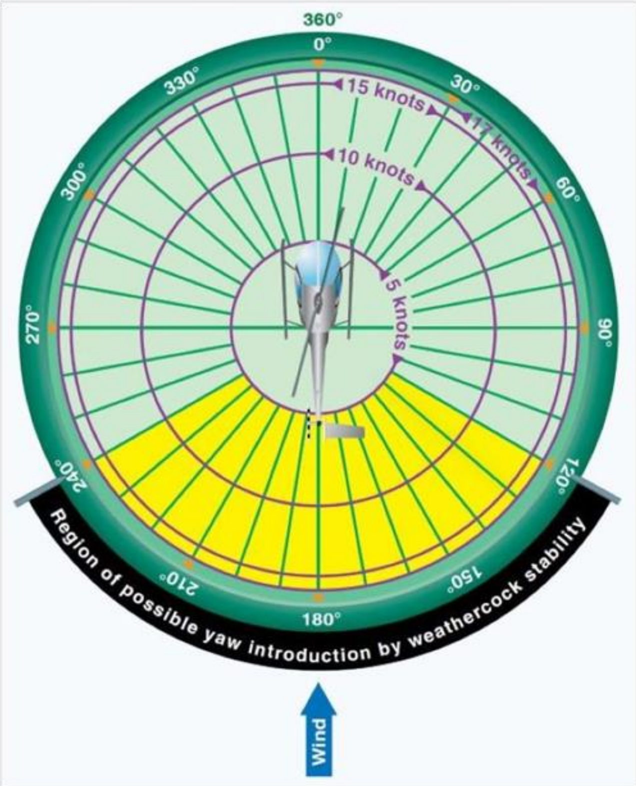

Figure 15. Weathercock stability, wind from the tail region, 120˚ to 240˚. Source FAA.

1.18.3 Documents containing information about unanticipated yaw

Unanticipated yaw has been highlighted by both regulators and helicopter manufacturers, with information about the phenomenon and how to address it being published. For example, the FAA has published information on unanticipated yaw in the Helicopter Flying Handbook. Additionally, due to a large number of accidents where unanticipated yaw has been a contributing factor, the FAA has issued Advisory Circular FAA AC 90-95.

The EASA has identified unanticipated yaw as a safety issue in the risk register for helicopter operations within the European Plan for Aviation Safety for (EPAS) 2023. The safety issue is described as related to the inability to detect, control and recover from unanticipated yaw or loss of tail rotor effectiveness (LTE) during low-speed flight phases, leading to a loss of helicopter control.

In 2010, the EASA published a safety document regarding the risk of unanticipated yaw, SIB 2010-12R1.

1.18.4 Similar accidents

Several similar accidents have been investigated by SHK, see final reports SHK 2023:10, RL 2022:02, RL 2005:05, RL 2001:31 and RL 2001:19.

1.18.5 Actions taken

None.

1.19 Special methods of investigations

Not relevant.

2. Analysis

2.1 Preconditions

The flight was the second of the day and was preceded by a refueling stop at Enköping/-Långtora Airport. The helicopter was parked on a grassy area outside a hangar with its nose pointing east. According to the load diagram, the take-off weight was 2,811 lbs, which is just below the maximum take-off weight of 3,000 lbs. According to SMHI's forecast and analysis, the wind was 240°/7 knots. This means that the wind was coming diagonally from behind on the right side, although the pilot perceived it as coming from the front.

2.2 Why was control of the helicopter lost?

After starting the engine, the helicopter hovered up to just above ground level. In connection with the hovering, the helicopter began to rotate clockwise. The rotation speed gradually increased, and the pilot was unable to stop the rotation. The helicopter rotated while rising to a height of approximately 15 metres before descending during rotation. In total, the helicopter rotated six times before hitting the ground.

The wind, coming obliquely from behind on the right side, within the range and wind strength capable of causing an unanticipated yaw, likely caused the helicopter to yaw unexpectedly to the right, turning up to the wind due to weathercock stability, see Figure 16. The helicopter's relatively high take-off mass, combined with high power output during the hover, may also have contributed to the tail rotor's insufficient thrust capacity.

The pilot's perception that the wind was coming from the front during take-off and hover likely contributed to the yaw being unexpected and to a delayed corrective response. As the rotation continued, full pedal movements may have been insufficient to counteract the yaw moment and stop the rotation. This likely explains why the pilot felt that the rudder inputs were ineffective.

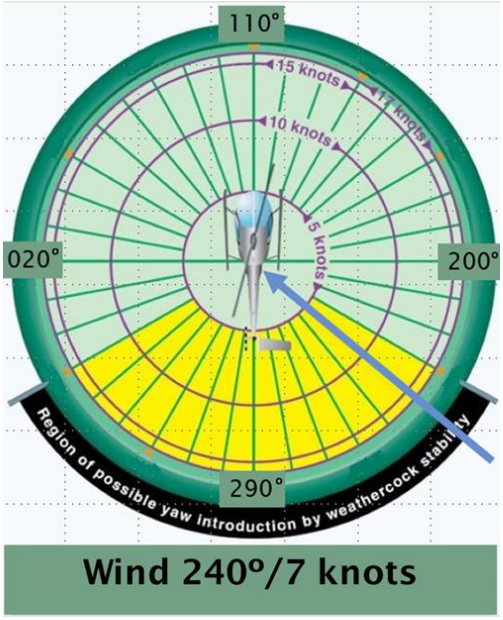

Figure 16. Weathercock stability, wind from behind, 120˚ to 240˚. Prevailing wind at the time was 240°/7 knots. The blue wind arrow shows the approximate wind direction relative to the helicopter. Markings added by SHK.

2.3 Survival aspects

2.3.1 Rescue operation

The fact that a private individual saw the accident and immediately raised the alarm entailed that the rescue operation was initiated without delay. The measures taken appear to have been adapted to the needs that arose in connection with the accident. Therefore, SHK has not found any reason to examine the rescue operation in more detail.

2.3.2 Position of crew and passengers and the use of seat belts

The pilot was seated on the left side and the system operator was seated on the right. Both crew members were wearing four-point seat belts and helmets. Both helmets sustained damage including cracks.

The fact that both were wearing four-point seat belts and helmets likely limited their injuries.

2.4 Technical examination of the helicopter

According to the pilot and system operator, no abnormal sounds, warnings or malfunctions were perceived before the rotation began.

The technical investigations conducted have not identified any faults that could have contributed to the accident. The damage to the helicopter, including the broken drive shaft and other damaged components of the yaw control system, is assessed to have occurred upon impact.

3. Conclusions

3.1 Findings

a) The pilot was qualified to perform the flight.
b) The helicopter had a Certificate of Airworthiness and a valid ARC.
c) At take-off and hover, the relative wind was obliquely from behind, from the right side.
d) The helicopter began to rotate and the pilot was unable to stop the rotation.
e) Analysis of sensor data from the helicopter's measurement system showed that the helicopter rotated six times.
f) The crew wore helmets and had four-point seat belts which contributed to reduce their injuries.
g) The operator had identified a specific risk of unanticipated yaw.
h) The measures taken by the emergency services appear to have been adapted to the needs that arose in connection with the accident.
i) No technical fault has been identified that could have contributed to the accident.
j) The damage to the helicopter, including the broken drive shaft and other damaged components of the yaw control system, is assessed to have occurred upon impact.

3.2 Causes and Contributing Factors

During take-off, the helicopter operated at high power output and a relatively high take-off weight. The relative wind was coming from the rear on the right side, which contributed to the helicopter's fin acting like a weather vane. These conditions likely exceeded the tail rotor's thrust capacity, resulting in an unanticipated right yaw that developed into an uncontrolled rotation.

Contributing factors:

The pilot's perception that the wind was coming from the front likely contributed to the yaw being unexpected.

4. Safety recommendations

None.

On behalf of the Swedish Accident Investigation Authority,

Jonas Bäckstrand Tony Arvidsson