

# PRELIMINARY REPORT



ACCIDENT 2022/2454

State Commission on Aircraft Accident Investigation (PKBWL)

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# PRELIMINARY REPORT

## ACCIDENT

OCCURRENCE NO. – 2022/2454

AIRCRAFT – Helicopter AS 350 B3e, F-HCHB

DATE AND PLACE OF OCCURRENCE – 23 May 2022, Rogoźnik II Lake



The Report is a document presenting the position of the State Commission on Aircraft Accidents Investigation concerning circumstances of the air occurrence, its causes and safety recommendations. The Report was drawn up on the basis of information available on the date of its completion. Use of this Report for any purpose other than air accidents and incidents prevention can lead to wrong conclusions and interpretations. This Report was drawn up in the Polish language. Other language versions may be drawn up for information purposes only.

**WARSAW 2022**

## Table of contents

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GENERAL INFORMATION.....	3
FACTUAL INFORMATION.....	4
1. History of the flight .....	4
2. Injuries to persons .....	5
3. Damage to aircraft.....	5
4. Other damage .....	6
5. Personnel information (crew data) .....	6
6. Aircraft information .....	7
7. Meteorological information .....	9
8. Aids to navigation .....	10
9. Communications .....	10
10. Aerodrome information.....	10
11. Flight recorders .....	10
12. Wreckage and impact information .....	11
13. Medical and pathological information.....	12
14. Fire .....	12
15. Planned actions.....	12

## GENERAL INFORMATION

Occurrence reference number:	2022/2454			
Type of occurrence:	ACCIDENT			
Date of occurrence:	23 MAY 2022			
Place of occurrence:	Rogoźnik II Lake			
Aircraft:	Helicopter Eurocopter AS 350 B3e (H125)			
Aircraft registration marks:	F-HCHB			
Aircraft user/operator:	Private company			
Aircraft commander:	CPL(H)			
Number of victims/injuries:	Fatal	Serious	Minor	None
	–	–	1	-
Domestic and international authorities informed about the occurrence:	ULC, BEA, EASA			
Investigator-in-Charge:	Michał Ombach			
Investigating Authority:	State Commission on Aircraft Accidents Investigation (SCAAI)			
Accredited Representatives and their advisers:	BEA			
Document containing results:	PRELIMINARY REPORT			
Safety recommendations:	None			
Addressees of the recommendations:	Not applicable			

## FACTUAL INFORMATION

### 1. History of the flight

On 23 May 2022, a pilot of the Eurocopter AS 350 B3e helicopter, F- HCHB registration marks, began his duty at 10:00 hrs LMT<sup>1</sup> in Lotnicza Baza Leśna (LBL<sup>2</sup>) in Brynek. At 10:40 hrs he was called to the first fire. The helicopter took-off at 10:44 hrs, the flight time was 23 minutes and the pilot dropped the water one time. About 14:20 hrs the pilot was called by the Dispatcher (PAD) of Regional Directorate of the State Forests (RDLP) in Katowice to fly again, to extinguish the fire near the points By 40 (50° 25' 30" N, 019° 03' 33" N) and Cy 40 (50° 23' 00" N, 019° 02' 40" E), in the area of Świerklaniec municipality. The take-off place was the LBL Brynek. The helicopter was taking on water with the *Bambi Bucket* from Rogoźnik II lake, located in the vicinity of the fire. There was also the other aircraft involved, the aeroplane PZL M-18 „Dromader”, operating from Niegowoniczki (EPNI) landing field.

After 8 drops, about 15:00 hrs, while taking water, the helicopter collided with the lake surface and sank (Fig. 1) coming to rest at a depth of about 2,5 m. The pilot managed to leave the cockpit on his own without sustaining any serious injuries. He was waiting for the evacuation sitting on the wreckage.

The first aid was provided by the diver of the State Fire Service (PSP) and then, the pilot was picked up to the shore for further medical treatment and transportation to the hospital.



Fig. 1 Crash scene of AS 350 B3e helicopter [source: SCAA]

A HEMS<sup>3</sup> helicopter (LPR) supported the rescue actions.

The wreckage was recovered from the water about 3 days after the accident. Until recovery, the wreckage was secured by PSP and the Police.

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<sup>1</sup> All times in Preliminary Report are in LMT, LMT=UTC+2 h

<sup>2</sup> Forest Aviation Base

<sup>3</sup> HEMS – Helicopter Emergency Medical Service

## 2. Injuries to persons

Injuries	Crew	Passengers	Others	TOTAL
Fatal	-	-	-	-
Serious	-	-	-	-
Minor	1	-	-	1
None	-	-	-	-

## 3. Damage to aircraft

As a result of the collision with water, drowning and recovery action, the helicopter was destroyed (Fig. 2÷3).

During the collision with water the main rotor together with its gearbox detached from the airframe. To lift the wreckage, the divers cut the oil and fuel pipes and electrical harness which were connecting the fuselage with the main gearbox, then the divers dismantled (under water) the main rotor blades from the rotor hub.

Due to main gearbox detachment, the kinematic connections between the engine and the gearbox were broken, the same happened with the engine and the shaft of the tail rotor. The engine was torn out from its rear fittings.

The tail rotor (detached blades from the hub) and its gearbox (broken fittings on the driving shaft) also sustained substantial damage. The bearings of the tail rotor driving shaft detached from the corresponding nests on the tail beam and the shaft was bent.

As a result of the collision with water the structure of the fuselage was deformed. The composite roof sustained damage, the windshield and its composite central support were destroyed. The left door was damaged due to collision with a main rotor blade.

The avionics and all components of the helicopter were immersed in water until the wreck recovery, i.e. for about 77 hours.

The structure of the cabin floor, the seats and their fittings were not affected.



Fig. 2 Helicopter wreckage during recovering to the lake shore. The main rotor and its gearbox were recovered separately [source: SCAA]



Fig. 3 The wreck after recovery, during an inspection in the Operator's hangar. Visible the area of gearbox mount, cracked skin of the fuselage and broken windshield [source: SCAA]

#### 4. Other damage

The fuel and other fluids from the wreckage slightly polluted the lake. Upon arrival, the PSP applied some absorption sleeves to prevent further pollution of water until the wreck recovery.

#### 5. Personnel information (crew data)

Pilot: male, aged 62, holder of the:

- valid CPL(H) licence, issued 30.04.2019 by the President of Civil Aviation Office;
- type rating (TR) to R44, valid until 30.06.2022;
- type rating (TR) to AS350 / EC130, valid until 30.04.2023;
- flight instructor rating (FI), valid until 31.05.2023;
- medical certificate class 1, issued 24.03.2022, valid until 24.09.2022, with VNL limitation;
- Operator Proficiency Check (OPC) dated 23.03.2022, valid until 22.03.2023.

#### Pilot's flight time (in hours)

Ostatnie	24 hours	7 days	90 days	Total time
All types:	1:17	14:29	25:09	3540:19
On AS350:	1:17	14:29	25:09	100:15

#### Last 10 take-offs prior to the occurrence

Date	A/C type	Type of flight	Flight time (HH:MM)	Notes
19.05.2022	AS350	SPO <sup>4</sup> / firefighting	1:21	-
20.05.2022	AS350	SPO / firefighting	2:27	-

<sup>4</sup> SPO – single person operation

21.05.2022	AS350	SPO / firefighting	1:27	-
21.05.2022	AS350	SPO / firefighting	2:41	-
21.05.2022	AS350	SPO / firefighting	2:06	-
22.05.2022	AS350	SPO / firefighting	1:20	-
22.05.2022	AS350	SPO / firefighting	0:24	-
22.05.2022	AS350	SPO / firefighting	0:14	-
23.05.2022	AS350	SPO / firefighting	0:23	-
23.05.2022	AS350	SPO / firefighting	0:40	The flight ended in the accident

## 6. Aircraft information

The AS 350 B3e (H125) helicopter (Fig. 4) manufactured by Eurocopter (currently under Airbus brand) is a single engine and a single rotor classic helicopter design. Manufactured since 1974; since 2011 under the name of H125.

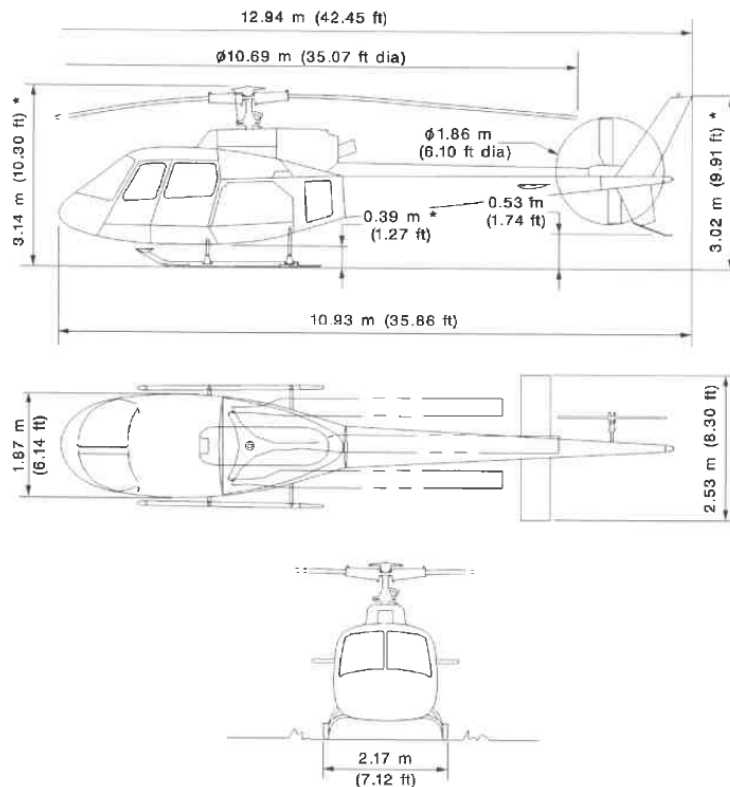


Fig. 4 AS 350 B3e Helicopter – three-view drawing [source: Helicopter Flight Manual]

The metal-composite fuselage has been equipped with skids.

The semi-rigid main rotor design with the head (Fig. 5) of „STARFLEX” type (Fig. 6) is free from the ball-bearings and because of this fact it does not require lubrication. The main clockwise rotor contains three reinforced glass-composite PVC foam core blades.



The vertical movement of the blades could be realized because of flexible composite arms of „Starflex” rotor disc and the horizontal movements are possible because of elastomer elements inside the hub.

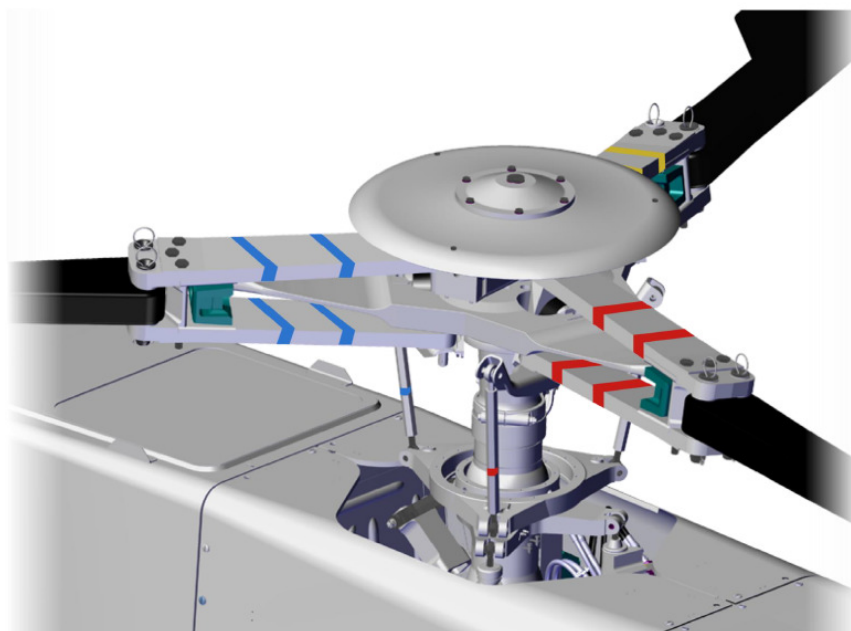


Fig. 5 Details of the hub of AS 350 helicopter [source: Internet]

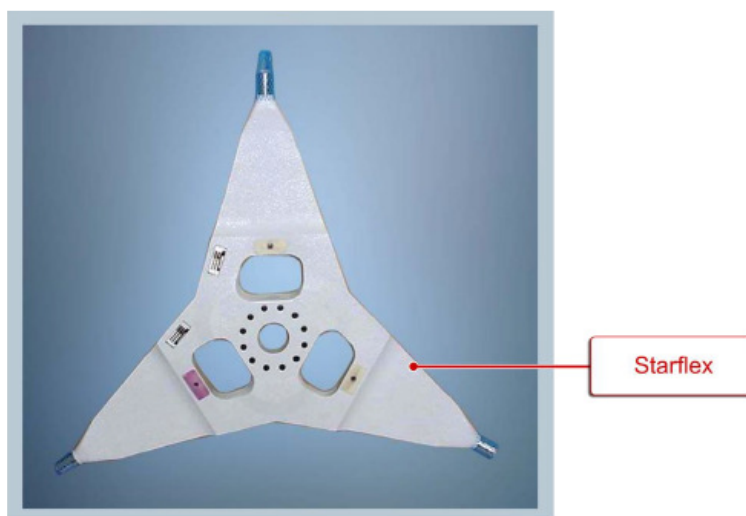


Fig. 6 The flexible „STARFLEX” rotor disc [source: Internet]

The two-blade tail rotor is installed on the articulated joint. The blades, consisting the PVC foam core, were manufactured from a reinforced glass-fibre composite.

The B3e variant is equipped with the turboshaft engine Safran HE Arriel 2D, 710 kW, managed by EECU<sup>5</sup> (FADEC).

<sup>5</sup> EECU – Electronic Engine Control Unit is a fully automatic, electronic device to control the engine actuation system depending on the situation and the commands received from cockpit. EECU receives data from all the sensors and commands from cockpit and controls all the parameters of the powerplant and its components to increase the work effectivity in specified conditions.

In the mid of instrument panel the VEMD (Fig. 7) (*Vehicle and Engine Multifunction Display*) is installed, which presents the main parameters of the helicopter and its powerplant.

The VEMD consists of double data processing module and data display module with dual LCD-screen.



Fig. 7 VEMD [source: Internet / Airbus helicopter]

The helicopter is designed to be flown by one pilot. Depending on cabin configuration the helicopter may take on board up to 6 passengers.

The maximum take-off mass is 2250 kg, but with the outer load up to 2800 kg. The maximum load to be hanged is 1400 kg.

#### Helicopter Registry Data

Year of manufacture	Manufacturer	SN	Registration	No of Registry	Date of entry into Registry
2013	Eurocopter	7695	F-HCHB	B31930	25.03.2021

## 7. Meteorological information

The flight was performed in daylight, in VMC.

METAR for EPKT aerodrome (about 8,5 km east from the occurrence place) at 12:00 hrs: CAVOK, wind direction variable, wind speed 5 kt, temperature 19°C, dew point 3°C, QNH 1011 hPa.

METAR EPKT 231300Z VRB05KT CAVOK 19/03 Q1011=

TAF EPKT 231130Z 2312/2412 11008KT CAVOK

BECMG 2408/2411 17010KT BKN014

TEMPO 2408/2412 4000 -RA BR=

METAR for EPKK aerodrome (about 64 km south-east from the occurrence place) and EPWR (Wrocław-Strachowice) aerodrome (about 170 km north-west from the occurrence place) as follow:

METAR EPKK 231300Z 06005KT 020V110 9999 SCT046 18/06 Q1012=

METAR EPWR 231300Z 12012KT CAVOK 20/05 Q1010=

## 8. Aids to navigation

Not used

## 9. Communications

The pilot maintained radio contact with the EPKT TWR on frequency 129,255 MHz, the radio contact with PSP supervisor on the ground and the other firefighting aircraft M-18 "Dromader" on frequency 123,450 MHz.

## 10. Aerodrome information

The helicopter took-off from the helipad in Brynek, registered in ULC registry under the record No 233.

Coordinates: N50°31'08", E018°44'17".

## 11. Flight recorders

The helicopter was equipped with the following data recorders:

### **Engine Data Recorder (EDR)**

Some of the data are also stored in the internal EECU memory.

**APPAREO Vision 1000** - the camera Vision 1000, manufactured by Appareo, was pre-installed by the helicopter manufacturer under the cockpit ceiling (left side from the longitudinal helicopter axis), between the front seats.

The camera records the following parameters:

- helicopter GPS positioning data (longitude, latitude, GPS altitude, ground speed, vertical speed and heading);
- pitch, roll and yaw;
- accelerations and angular speed of the aircraft relative to all 3 axis;
- video imagery (instrument panel, controls and - partly - outside view from the helicopter);
- audio data inside the cabin.

The camera uses two independent memories: an external (which is a SD card) and an internal one. The internal, crash hardened memory, could be the first source of the information while investigating an occurrence. It contains 2 hours of last imagery and audio as well as GPS data of the last 200 flight hours.



Fig. 8 The APPAREO Vision 1000 camera [source: helicopter manufacturer]

### **Apple iPad mini 4 with SkyDemon software**

The pilot was equipped with his personal navigational device Apple iPad Mini 4 with SkyDemon software. The device, in addition to its navigational function, enabled also to record the flight trajectory, altitude and aircraft ground speed, based on received GPS data.

## **12. Wreckage and impact information**

### **12.1 Place of occurrence**

The collision with the lake Rogoźnik II surface took place near Rogoźnik village, in the Bobrowniki municipality.

Coordinates: N52°24'12", E019°03'04". Elevation 958 ft.



Fig. 9 Place of the take-off and the occurrence [source: Geoportal]

### **12.2 Wreckage**

The crash site was shown in Fig. 1.

Helicopter wreckage was found at the bottom of the lake, around the wreck. There were no parts detached from the helicopter in flight, before collision with water.

### **13. Medical and pathological information**

The pilot got out of the wreckage on his own. After the examination in the hospital he was released.

### **14. Fire**

The helicopter did not catch fire before or during collision with the water.

### **15. Planned actions**

- 1) Further wreckage inspection, among others, check of kinematics continuity of the control system, analysis of damage to the helicopter airframe and its powerplant, to identify the damage caused by the recovery action;
- 2) Securing and analysis of helicopter continuing airworthiness documents, pilot's qualifications, his logbook and statement as well as Operator's records;
- 3) Recovery and analysis of recordings from Vision 1000 camera, EDR, FADEC and Apple iPad (GPS track), in cooperation with BEA (*Bureau d'Enquêtes et d'Analyses*);
- 4) Further SCAAI activities will be based and dependent on the results of analysis of recordings listed in item 3).

**END**

*Signature on original*  
*Investigator-in-charge*