State Commission on Aircraft Accidents Investigation

ACCIDENT 2020/1555

RESOLUTION

of 22nd December 2022

Type and model of aircraft:	Ultralight helicopter, Phoenix UH-22
Registration marks:	SP-HBOG
Date of occurrence:	30th June 2020
Place of occurrence:	Strzegom n. EPLB

After reviewing the materials available to the State Commission on Aircraft Accidents Investigation (SCAAI) related to the occurrence, it was concluded that:

1. The course of the occurrence was as follows:

On 30th June 2020, at 20:16 hrs LMT[1], the pilot and owner of the Phoenix UH-22 helicopter, SP-HBOG registration marks, took off from Stawiska (helicopter base) to perform a recreational flight to Strzegom (a town located several kilometers from the place of departure). A passenger, an acquaintance of the owner, was also on board.

During the flight, at a distance of approx. 5 km from the place of departure, increasing difficulties with maintaining the direction and balance of the helicopter occurred – according to witnesses, the helicopter wobbled and swayed, which was accompanied by abnormal sounds from the powerplant. The owner failed to control the helicopter, which lost its balance and at 20:20 hrs collided with the ground.

The owner and passenger died on the spot, and the helicopter was destroyed.

Witnesses called emergency services by calling the 112 emergency number and went to the scene of the accident to provide assistance.

[1] All times in the Report are given in LMT, on the day of the accident LMT=UTC+2h.

Fig 1. The flight path superimposed on a Google satellite image, white circle indicates take-off place, red circle indicates the accident site

2. Crew information

Helicopter owner: male, aged 46, (seated on the right side of the cockpit) holder of:

- Ultra-light Aircraft Certificate Pilot, issued by the Polish Civil Aviation Authority on 22 January 2015 with Ultra-light Airplane Pilot (Land) rating valid until 31 January 2025; pilotní průkaz[2] issued by LAAČR[3] 24 September 2012, with ULL(A)[4] rating, valid until 09 September 2020.

<u>The owner of the helicopter did not have any license to fly helicopters.</u>

The helicopter owner of the flew the following ultralight aeroplane types: Pipistrel Storch, Pipistrel Sinus, Pipistrel Taurus and CTS-W.

[2] Czech pilot license.
[3] LAAČR – Light Aircraft Association of the Czech Republic (cz. Letecka Amaterska Asociace Česke Republiky).
[4] ULL(A) – Ultra-light (less than 600 kg) aircraft piloting rating (cz. Ultra Lehke Letadlo).

The helicopter owner had the aero-medical certificates:

- EU/LAPL[5] Class 2, issued by Luftfahrt-Bundesamt[6] on 14th March 2019, valid until 14 March 2021;
- LAPL Class1/2, issued by Úřad pro Civilní Letectví[7] on 29th October 2014, valid until 28th December 2026 (Class 2 and LAPL).

Passenger – male, aged 48, occupying the left seat, was qualified to fly ultralight aeroplanes.

3. Aircraft information

The Phoenix UH-22 SP-HBOG helicopter was a certified standard Robinson Beta helicopter with serial number 1041, manufactured in 1989.

The helicopter was powered by a Lycoming O-320-B2C engine, serial number: L-15481-39A, piston, 4-cylinder with carburettor, horizontally opposed, air-cooled, with a maximum power of 131 HP and a continuous power reduced to 124 HP.

The first registration of the helicopter was done in UK, where the helicopter received G-BPYX registration marks on 5th June 1989. Then, in 1994, the helicopter was sold, deregistered and re-registered, receiving the G-OMMG registration marks on 25th February 1994. From 11th January 2016, when the validity of the Airworthiness Review Certificate and (as a consequence) the Certificate of Airworthiness expired, the helicopter was not operated. In June 2017, the helicopter was sold in parts to Poland, and in May 2019 it was deregistered from the UK Aircraft Register.

On 10-11 September 2019, in Poland, a scheduled 100H maintenance was effected on the helicopter. Then, on 22nd September 2019, the helicopter, with A74BOG registration marks was entered into the records of the ASC[8] as Phoenix UH-22 "ultra-light vehicle based on Robinson R-22 technology" in the powered rotor wing category. The above registration was valid until 21st September 21 2022, but after less than two months i.e. 18th November 2019, the helicopter was deregistered.

In the meantime, i.e. on 11th October 2019, the helicopter made its first flight in Poland, and then on 13th December 2019, as Phoenix UH-22, with SP-HBOG registration marks, it was entered into the register of the Polish Civil Aviation Authority under number 1589 in the K6E category (experimental), in the UL-H subcategory (ultra-light helicopter).

The helicopter was entered into the K6E category in violation of the provisions of the Regulation of the Minister of Transport, Construction and Maritime Economy of 7th August 2013 on the classification of aircraft (Journal of Laws of 2018, item 1568), because its modifications were not related to research, experimental or scientific

[5] LAPL – Light Airplane Pilot Licence.
[6] LBA – German Civil Aviation Authority.
[7] UCL – Czech Republic Civil Aviation Authority.
[8] Aero Sports Connection – organization operating in the US.

purposes, but their purpose was to reduce the mass of the certified helicopter in order to classify it as a flying device.

The modification of the helicopter consisted in reducing the MTOM from 622 kg to 600 kg. In order to reduce the mass of the helicopter, the owner decided to replace the upholstery of the cabin and seats.

During the modification of the helicopter, the original metal blades of the main rotor were replaced with composite (carbon-kevlar) blades manufactured by Rotor-Tech (blade designation according to the manufacturer - P/N: RT/HB/CK/0012-T4/R22).

The main rotor blades were replaced on 24th June 2020. After the replacement, on 29th June 2020, their balancing and tracking was performed. A day later, on 30th June 2020 the accident occurred.

Since the replacement of the main rotor blades until the accident, the helicopter had performed 13 flights in a total time of 3 hours 9 minutes as follow:

- 24th June 2020 (7 flights in a total time of 1 hour 30 minutes – test flights during tracking of the main rotor blades);
- 26th June 2020 (6 flights in a total time of 1 hour 35 minutes – among others hovering test).

Prior to the replacement of the blades, the helicopter showed increased vibrations that were transferred to the control system. The owner did not remove the cause(s) of the vibrations, but attached a lead bar to the cyclic to suppress them.

Fig 2. Cyclic with visible lead bar attached with tape

In the application for the UH-22 registration and in the *Information on airworthiness assessment of the flying device*, his owner was listed as a manufacturer and an entity which confirmed its airworthiness.

The owner of the helicopter was registered by the Civil Aviation Authority as maintenance services provider (no 102 USP/Z, approval was issued on 17th October

2017), covering ultralight aeroplanes, including: repair, maintenance of aircraft and their components, maintenance release, extension and renewal of validity of permits to fly..

The above authorizations did not include ultralight helicopters.

The modification of a certified helicopter consisting in the replacement of the original main rotor blades with blades of a different type is a major modification, requiring compliance with the provisions of *Annex I (Part-21) Section A Subpart E of COMMISSION REGULATION (EU) No 748/2012 of 3 August 2012 laying down implementing rules for the airworthiness and environmental certification of aircraft and related products, parts and appliances, as well as for the certification of design and production organisations* and not adoption and meeting the technical requirements referred to in Chapter 3 of Annex 5a of the exemption regulation[9].

When modifying the helicopter, the requirements of none of the above-mentioned regulations were met, and their contractor was not authorized to perform the activities in this respect. Modifications in this scope require a thorough technical analysis and ground and flight tests to practically determine changes in the helicopter's handling characteristics and performance.

4. Final decision of the Commission:

Acting pursuant to art. 135 item 6 of the Act of 3 July 2002, Aviation Law (as amended) SCAAI decided to refrain from further investigation of the accident for the following reasons:

1) at the time of the occurrence the aircraft was used by a persons who was not licensed to fly that type of aircraft;
2) the aircraft was manufactured and operated contrary to the applicable regulations.

5. Safety Recommendations:

Safety Recommendation 2020/1555/1

During the investigation, it was found that the Phoenix UH-22 flying device, SP-HBOG registration marks, was entered into the Polish Civil Aviation Authority register without proper airworthiness assessment.

Since such cases may also concern other flying devices, in order to exclude irregularities in the above-mentioned matter, SCAAI recommends that the President of the Civil Aviation Authority shall conduct an analysis and prepare a draft amendment to the regulations issued on the basis of art. 33 item 2 of the Act of 3 July 2002, Aviation Law (as amended) related to:

[9] Regulation of the Minister of Transport, Construction and Maritime Economy of 26 March 2013 on the exclusion of the application of certain provisions of the Aviation Law to certain types of aircraft and on defining the conditions and requirements for the use of these aircraft (Journal of Laws of 2019, item 1497)

a) entering flying devices into the CAA register – to take into account the introduction of provisions requiring to submit, together with the first airworthiness assessment performed before the first flight of the aircraft, a technical assessment of the aircraft design carried out by the entities authorized to perform such assessment, referred to in the exclusion regulation (the so-called approving entities);

b) defining of criteria and requirements for amateur and experimental constructions and assessment of their fulfilment by approving entities.

Safety Recommendation 2020/1555/2

During the investigation, it was found that the Phoenix UH-22 helicopter, SP-HBOG registration marks was classified into the K6E category (experimental category), in the UL-H subcategory (ultra-light helicopter) in violation of the provisions of the *Regulation of the Minister of Transport, Construction and Maritime Economy of August 7, 2013 on the classification of aircraft (Journal of Laws of 2018, item 1568)*, because its modifications were not related to research, experimental or scientific purposes, but their purpose was to reduce the mass of the certified helicopter in order to classify it as a flying device.

Since such cases may also concern other flying devices, in order to exclude irregularities in the above-mentioned field, SCAAI recommends that the President of the Civil Aviation Authority:

as part of oversight of users of flying devices, carried out in accordance with Art. 27 of the Aviation Law, pay special attention to aircraft entered in the records in the K6E (experimental) category, whether they meet the criteria referred to in the regulation on the classification of aircraft,

Safety Recommendation 2020/1555/3

During the investigation, it was found that there are cases of misinterpretation of the regulations on the construction of flying devices and modifications of aircraft.

In order to exclude errors in this matter and to standardize the interpretation of the regulations, SCAAI recommends that the President of the Civil Aviation Authority:

develop guidelines for manufacturers and builders of flying devices covering construction and modification of aircraft and give the seminar in which the following will be clearly explained:

a) who is the manufacturer or builder of the aircraft, and;
b) that the construction of new devices based on certified aircraft is inconsistent with both national and European Union regulations.

6. Taken actions:

SCAAI notified the prosecutor’s office and the President of the Polish Civil Aviation Authority of the suspected infringement of regulations in force.

Investigator-in-Charge	SCAAI Chairman
……	……
(signature on orginal)	(signature on orginal)