

PKBWWL

State Commission on Aircraft Accidents Investigation

PRELIMINARY REPORT

2023-0069

OCCURENCE NUMBER

ACCIDENT

SCF-PP: System/Component Failure or Malfunction (Powerplant)

LOC-I: Loss of Control – Inflight



The sole objective of safety investigations is the prevention of future accidents and incidents.

The Commission does not apportion blame or liability. The investigation is independent and separate from any judicial or administrative proceedings.

Any use of the Report for purposes other than prevention of accidents and incidents may lead to wrong conclusions and interpretations.

Private user, recreational flight
FLYSYNTHESIS ITALY, ULL STORCH CL, OK-
TUV 61
Brzeska Wola, 19 September 2023

The Preliminary Report was issued by PKBWL based on information available on the date of its completion.

The Report presents only facts related to circumstances of the occurrence and ad hoc safety recommendations, when necessary. This Report was drawn up in Polish

19 October 2023

Warsaw,



State Commission on Aircraft Accidents Investigation
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GENERAL INFORMATION

LEGAL BASIS

The State Commission on Aircraft Accidents Investigation (Państwowa Komisja Badania Wypadków Lotniczych, PKBWL) is a civil aviation safety investigation authority referred to in Article 4(1) of Regulation (EU) No 996/2010 of the European Parliament and of the Council of 20 October 2010 on the investigation and prevention of accidents and incidents in civil aviation and repealing Directive 94/56/EC (OJEU L 295, 12.11.2010, p. 35, as amended).

The Commission conducts its investigations on the basis of the provisions of the Aviation Law of 3 July 2002 (Dz.U. 2002, No 130, item 1112, as amended) and the European Union regulations related to accidents and incidents in civil aviation and takes into account the standards and recommended practices set out in Annex 13 to the Convention on International Civil Aviation made in Chicago on 7 December 1944 (Dz.U. 1959, item 212, as amended).

BASIC INFORMATION ABOUT THE OCCURRENCE

User, flight type – Private user, recreational flight.

Manufacturer, type, model and registration marks of the aircraft – FLYSYNTHESIS ITALY, ULL STORCH CL, OK-TUV 61.

Place and date of the occurrence – Brzeska Wola, 19 September 2023

OCCURENCE REPORTING

The occurrence was reported to PKBWL in accordance with the mandatory reporting system on 19 September 2022.

The occurrence was allocated the reference number – 2023-0069.

Based on the initial information, the occurrence was classified as an accident.

During the investigation the classification of the occurrence was not changed.

NOTIFICATION ABOUT THE OCCURRENCE

PKBWL notified the following entities about the occurrence:

- state of registration – the Czech Republic;
- state of the aircraft manufacturer – Italy;
- state of the engine manufacturer – Austria;

- EASA;
- European Commission;
- ULC.

ORGANISATION OF THE INVESTIGATION

The investigation was conducted by – PKBWL

Investigator-in-Charge (IIC) – Krzysztof Błasiak.

Specialist groups – no specialist groups were established.

Accredited Representatives (and their advisers)– the following State appointed its ACCREP:

- state of the aircraft manufacturer – Italy;

SAFETY RECOMMENDATIONS

Unless otherwise indicated, recommendations in this Report are addressed to the regulatory authorities of the State having responsibility for matters with which the recommendation is concerned. It is for those authorities to decide what action is taken.

TIME

All times in the Report are given in LMT. On the day of the occurrence LMT=UTC+2h.

DATE

If the Report contains a date in digital format, the individual digits mean DD/MM/YYYY, where DD is the day, MM is the month, and YYYY is the year.

FIGURES AND TABLES

Unless stated otherwise in the Report, the PKBWL is the source.

SYNOPSIS

A man, aged 55, holding a private pilot licence for aeroplanes PPL(A), purchased an ultralight aeroplane Storch CL in the Czech Republic. After the purchase, the man took off from the Oáza Dědřichov airfield near Uničov in the Czech Republic on 18 September 2023. The pilot had planned to fly to the Usti nad Orlicy aerodrome (LKUO), and then intended to continue the flight to Poland. The following day, at around 17:30 hrs, a co-owner of the EPBI airfield noticed an aeroplane flying from west to east at an altitude of approximately 150 meters AGL. The aeroplane circled the airfield and flew away eastwards. After a while, the aeroplane disappeared from sight, obscured by treetops, and then a loud noise was heard. Witnesses found the aeroplane nose-dived into the ground. Despite the swift rescue operation and transportation of the injured pilot to hospital, he died from the injuries sustained.

SYMBOLS, ACRONYMS AND ABBREVIATIONS

SYMBOLS

°	Degree e.g. °C (temperature) and 1° (angle)
%	Percent e.g. 95% of fan speed (N1)
'	minute
”	second

ACRONYMS AND ABBREVIATIONS

AGL	Above Ground Level
AKI	Anti-Knock Index
C	Celsius degrees
ULC	Polish Civil Aviation Authority (Urząd Lotnictwa Cywilnego)
cm	centimetre(s)
ELT	Emergency Locator Transmitter
FIS	Flight Information Service
h/hrs	hour/hours
IIC	Investigator-In-Charge
kg	kilogram(s)
l	litre(s)
m	metre(s)
min	minute(s)
mm	millimetre(s)
RON	Research Octane Number
s	second(s)
SEPL	Single Engine Piston Land
UTC	Coordinated Universal Time
VFR	Visual Flight Rules

1. FACTUAL INFORMATION

1.1. History of the flight

A man, aged 55, holding a private pilot license for aeroplanes PPL(A), decided to purchase an ultralight aeroplane Storch CL in the Czech Republic. In mid-August 2023, the man visited location of the aeroplane, familiarised himself with its design, and performed two flights. Later, in the evening of 17 September 2023, the man returned to the Czech Republic to collect the aeroplane. After completing formalities related to the purchase, the seller handed over the aeroplane to the buyer, who performed one more flight in it the same day. According to the seller's account, all three flights made by the new owner were uneventful

The following day, on 18 September 2023, the pilot prepared the aeroplane for the flight and took off at 10:00 hrs from the private airfield, Oáza Dědřichov near Uničov in the Czech Republic. According to information provided by the seller of the aeroplane, the pilot planned to fly to the Usti nad Orlicy aerodrome (LKUO), and then continue the flight to Poland.

On the next day, 19 September 2023, at 14:13 hrs, the pilot tried to make a telephone call to a co-owner of the Brzeska Wola airfield (EPBI) in the municipality of Białobrzegi. At 14:46 hrs the airfield co-owner called back the pilot, who was in the aeroplane. The pilot informed him that he had been flying from Opole and expressed his intention to land at EPBI, inquiring about the availability of fuel at the airfield. The airfield co-owner offered to assist the pilot by giving him a lift to a fuel station after his landing.

About 17:30 hrs, the co-owner of the EPBI airfield noticed a white ultra-light aeroplane flying from west to east at an altitude of approximately 150 meters AGL. The aircraft circled the airfield, and flew away eastwards.

At the same time, a woman present in the area adjacent to the airfield observed the aeroplane. According to her account, the aeroplane came from the direction of the airfield, then turned back towards the airfield. After a while, the aeroplane disappeared from sight, obscured by treetops. Then, the witness heard a thud. The witness ran in the direction from which she had heard the noise. Having reached the scene, she saw the aeroplane nose-dived into the ground. She immediately called for help by dialling the emergency number 112.

The emergency call was received at 17:38 hrs. Rescue services arrived at 17:54 hrs, cut the aeroplane wreck and recovered the unconscious pilot. Despite the swift rescue operation and transportation of the injured pilot to hospital, he succumbed to the injuries sustained.



Figure 1. The Storch CL OK-TUV 61 at the accident scene

1.2. Injuries to people

Table 1. General – summary of the number of injuries

Injuries	Crew	Passengers	Total in the aircraft	Others
Fatal	1		1	
Serious				
Minor				Not applicable
None				Not applicable
TOTAL	1		1	

1.3. Damage to aircraft

The aeroplane was destroyed. As a result of the collision with the ground and as a consequence of the action of recovering the pilot from the fuselage carried out by the Fire Service, the front section of the aeroplane was detached from the rest of the airframe. The front fairing and the cockpit doors on both sides were torn out from the wreckage during the rescue action. The accident caused the engine together with the firewall were detached from the fuselage, and the instrument panel was destroyed.



Figure 2. The Storch CL OK-TUV 61 at the accident scene



Figure 3. The Storch CL OK-TUV 61 at the accident scene

The wings of the aeroplane remained in place, secured to the centre section of the wing and supported by the wing struts extending from the fuselage. The fairing of the left wing tip separated from the wing.



Figure 4. The Storch CL OK-TUV 61 at the accident scene. The left wing tip fairing can be seen in the bottom left corner of the picture

The aeroplane's main landing gear remained in place, and the front landing gear leg broke and separated from the wreckage. The tubular tail beam of the airframe fractured at the beam-fuselage transition.



Figure 5. The Storch CL OK-TUV 61 at the accident scene – the tail section of the airframe

The tail unit remained mostly undamaged after the accident. Three propeller blades at the nose of the aeroplane broke off from the hub at their root and remained under the aircraft engine. The position and condition of the propeller

blades show that the aeroplane's engine was not running at the time of the aeroplane's collision with the ground.



Figure 6. The propeller blades of the Storch CL OK-TUV 61 recovered from under the wreckage.

At the place of occurrence, the Commission checked continuity of the aeroplane's control kinematics, and found that it was maintained after the accident.

1.4. Other damage

As a result of the accident and the rescue action, about 100 m² of a blueberry plantation was destroyed.

1.5. Personnel information

Pilot: male, aged 55.

Licence: PPL(A) – Private Pilot Licence (aeroplane).

Ratings endorsed in the licence:

- SEP(L) valid until 31 May 2025

- Radio-telephone qualifications: R/T equipment operation on board of an aircraft in Polish;
- Language fluency: Polish/level 6/for life.

Total flight time:

- about 97 h and 55 min, including 50 h and 15 min as pilot-in-command.

Flight time on days:

- 18/09/2023 – 1 h and 56 min;
- 19/09/2023 – approx. 2 h and 45 min;

Flight time on type:

- approx. 5 h and 19 min;

Flight time prior to the occurrence:

- over the last 24 h: approx. 3 h and 58 min;
- over the last 7 days: approx. 4 h and 41 min;
- over the last 90 days: approx. 8 h and 2 min.

There are discrepancies between the pilot's documentation and the documentation made available by the flight centre where the pilot had performed training flights. This fact had no effect on the occurrence.

OPC passed on SEP (L), carried out on 11 May 2023

Aeromedical certificate:

- Class 2, with VNL limitation, valid until 11 September 2024;
- LAPL, valid until 22 August 2025.

Rest over the last 48 h:

- The Commission has been unable to establish conditions of the pilot rest.

Familiarity with the airfield and pilot's experience on the flight route:

– the pilot performed three flights at the departure airfield. The pilot had not flown on the flight route or on the airfields he intended to land. The pilot had notes from preparations to flights.

Place in the cockpit and activities performed:

- during the occurrence, the pilot occupied the left seat.

1.6. Aircraft information

1.6.1. Airworthiness and maintenance

a) General information:

- ultralight aeroplane, braced high-wing monoplane, made of composite structures with a solid three-support landing gear with a front leg, propelled by a piston engine fitted with a single tractor propeller;
- manufacturer – Fly Synthesis (Italy);
- factory designation (model) – ULL STORCH CL;
- serial number – 27;
- year of manufacture – 1994;
- registration marks – OK-TUV 61;
- owner – a private individual;
- user – a private individual.

b) History of the aeroplane:

- flight time since new – 305 h 44 min;
- flight time since engine replacement – 75 h 14 min;
- flight time since last inspection – 16 h 51 min;

c) Engines and propellers:

- non-certified Rotax 582, manufacturer BRP-Rotax GmbH (Austria), installed in the aeroplane on 28 May 2020, operation time since new – 75 h 14 min;
- propeller WOODCOMP – model KLASSIC 174/3/L with a diameter of 1740 mm, manufacturer Woodcomp (Czech Republic), date of manufacture: 6 May 2020, installed most probably during the engine replacement.

d) Fuel:

- recommended: automotive fuel – unleaded petrol as per European Standard EN228, min. RON 90, min. AKI 87;
- used in flight – no fuel assessment was carried out;
- on board after the accident – approx. 5.2 l

- distribution on board after the accident: right tank – about 5 l, left tank – about 0.2 l (installation lost tightness as a result of the accident).
- e) Aircraft load:
- Empty weight – 245 kg
 - Allowable baggage weight – 12 kg
 - Maximum take-off weight – 450 kg
 - Minimum pilot weight – 45 kg;
 - Maximum pilot + passenger weight – 180 kg;
 - Maximum fuel weight (58 l) – 45 kg.

1.6.2. Aircraft systems or parts contributing to the accident:

Rotax 582 is a two-cylinder, two-stroke engine. The manufacturer ceased manufacturing this engine model at the end of 2021.

The operator's manual of the Rotax 582 engine contains the following provision:

„Safety instructions ▲ WARNING: This engine, by its design, is subject to sudden stoppage. Engine stoppage can result in crash landings, forced landings or no power landings. Such crash landings can lead to serious bodily injury or death. ▲ WARNING: Never fly the aircraft equipped with this engine at locations, air speeds, altitudes or in other situations which do not allow a successful no-power landing after sudden engine stoppage. Aircraft equipped with this engine must only fly in DAYLIGHT VFR conditions. ▲ WARNING: This is not a certificated aircraft engine. It has not received any safety or durability testing, and conforms to no aircraft standards. It is for use in experimental, uncertificated aircraft and vehicles only in which an engine failure will not compromise safety. User assumes all risk of use, and acknowledges by his use that he knows this engine is subject to sudden stoppage”.

1.7. Meteorological information

According to METAR for the EPWA airfield, the meteorological conditions on 19 September 2023 at 18:00 hrs (16:00 UTC) were as follows:

EPWA 191600Z 26005KT 9999 FEW015 20/17 Q1010 NOSIG=

Which means:

- date: 19/09/2023
- time: 16:00 UTC;

- wind direction: 260°;
- wind speed: 5 kt;
- visibility: over 10 km;
- cloud cover: from 1/8 to 2/8, cloud base 1,500 ft AGL;
- ambient temperature: 5°C;
- dew point: 5°C;
- pressure: QNH 1010 hPa;
- no significant changes in meteorological components had been forecast.

1.8. Aids to navigation

The OK-TUV 61 flight was carried out according to VFR and the use of ground navigation aids was not required.

1.9. Communications

The pilot of the OK-TUV maintained standard radio communication with FIS Warsaw in Polish. The communication was clear in both directions. It appears from the radio correspondence records that the pilot notified FIS Warsaw of the flight from the Opole Nowa Wieś aerodrome (EPOP) to the Brzeska Wola airfield (EPBI).

1.10. Aerodrome information

The Brzeska Wola Airfield (EPBI) is located 5 km south-east from Białobrzegi Radomskie, near Route S7. The airfield is open from dawn to dusk. The airfield has one grass runway:

- RWY 28 – landing distance available 775 m;
- RWY 10 – landing distance available 660 m.

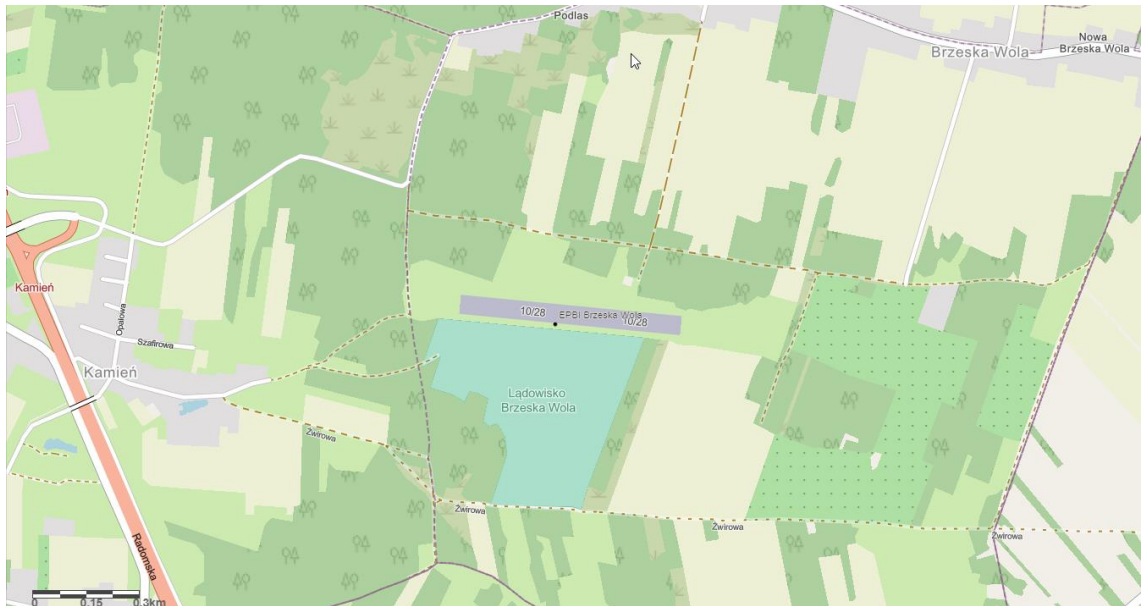


Figure 7. Position of EPBI [source: ULC].

1.11. Flight recorders

The accident aeroplane was not equipped with any flight recorders. No type of flight recorder was required under applicable regulations.

Before the accident, the pilot had recorded a 28 second film from the aircraft cabin with a smartphone, and sent it to his close person. This film does not contain materials that could be used for establishing the course and cause of the accident.

1.12. Wreckage and impact information

The collision of the aircraft with the ground occurred at a blueberry plantation adjoining the Brzeska Wola airfield. The aircraft collided with the ground in a near vertical position, with its nose down, without banking. The front of the aeroplane stuck into the soft soil, as a result of which the aeroplane's propeller blades were broken off from the hub and remained under the wreckage, pressed to the ground and uniformly arranged at every 120°. The fire service unit that arrived at the accident scene lowered the aeroplane's tail and cut the cabin open in order to recover the pilot from the wreckage. Most of the airframe along with the wings, struts, tail beam and tail unit kept their integrity. The main landing gear also survived in good condition.



Figure 8. The site of the Storch CL OK-TUV 61 collision with the ground is marked with the asterisk, and the location of the runway of the Brzeska Wola airfield is marked with the yellow rectangle [source: Geoportal]

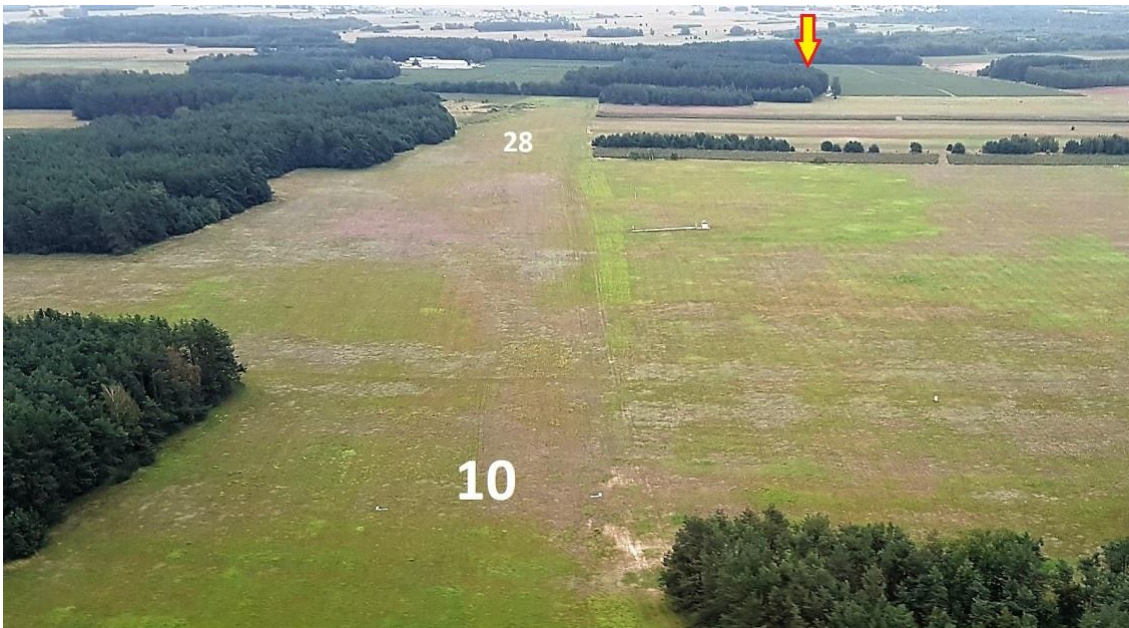


Figure 9. The runway of the Brzeska Wola airfield. The arrow indicates the site of the Storch CL OK-TUV 61 collision with the ground [source: lotniska.dlapilota.pl]

1.13. Medical and pathological information

As a result of the accident, the pilot sustained extensive multiple-organ injuries. The services that arrived at the accident scene had undertaken rescue activities, and subsequently transported the casualty in a critical condition to hospital, where he died.

As of the day of publication of this preliminary report, no results of toxicological analysis were available, which could allow the Commission to establish whether the pilot was under the influence of alcohol or other substances affecting his actions.

Until the day of publication of this preliminary report, no evidence was found to prove that any illness, inability to act or physiological factors affected the pilot's actions.

1.14. Fire

No fire broke out during the accident flight, or after the accident.

1.15. Survival aspects

The pilot who died as a result of the accident was occupying the left seat in the cockpit and had safety belts fastened, restraining him in the seat during the occurrence. These safety belts were cut during the rescue action.

The forces affecting the aeroplane during the vertical collision of its nose part with the ground caused the destruction of the aeroplane's front structure and very high g-forces on the pilot's body. If the collision with the ground had happened in a different configuration, the pilot would have a real chance to survive.

Before the collision with the ground, the aeroplane most likely was making a final approach to the nearby airfield, and thereby it was moving at a speed close to minimal and was at a low altitude above the ground level. If the pilot had been surprised by a hypothetical engine failure and symmetrical stall of the aeroplane took place, an immediate pull on the control stick "towards himself", could theoretically have pulled up the aeroplane's nose and made the main landing gear wheels hit the ground. In such a case, the landing gear legs would take over most of the impact energy, and the g-force direction perpendicular to the pilot chair seat would have given better chances to survive this accident.

The aeroplane was not equipped with an ELT transmitter.

1.16. Tests and investigations

The PKBWL team performed a visual inspection at the accident scene, during which:

- a) photo documentation of the wreckage and the accident scene was made;
- b) maintenance of the continuity of the control system kinematics was checked with a positive result;

- c) the aeroplane's fuel tanks were checked and fuel samples were taken and preserved for a potential future analysis. Approximately 5 l of fuel was found in the right tank. Approximately 0.2 l of fuel was found in the left tank, however the fuel line coming out of the left tank was broken during the accident. At the moment of the accident, the aeroplane's engine was being supplied from the left fuel tank;



Figure 10. The fuel cocks of the Storch CL OK-TUV 61 after the accident. The closed right tank fuel cock and open left tank fuel cock can be seen.

- d) the engine covers were dismantled and ignition plugs were screwed out (the colour and amount of carbon deposits was assessed as correct);
- e) the carburettor float chambers were disconnected to check if the engine was supplied with fuel at the time of the accident. Fuel was found in the float chambers of both carburettors.



Figure 11. The carburettor float chamber of the Storch CL OK-TUV 61 with fuel found inside

- f) a test manual turn of the propeller hub was carried out in order to check the resistance of the engine assembly of crankshaft and pistons. The engine shaft was turning without any excessive resistance.
- g) the aeroplane and pilot documentation found in the wreckage was preserved for further analyses.

1.17. Organisational and management information

The aeroplane was a private property of the pilot. The pilot did not run a commercial aviation business.

1.18. Additional information

During the visual inspection of the contents of the Storch CL OK-TUV 61 wreckage, the PKBWL investigation team noticed the pilot's notes. Those notes contained the following information: radio frequencies of successive airfields near the intended flight route, correct operating parameters of the propulsion system, speeds, flap settings etc. The fact that they were made and kept in the cockpit along with maps, flight calculator and similar instruments showed that the pilot had been well prepared for the flight. In addition, it appears from witness accounts, that the pilot planned to spread the ferry flight from the place of purchase in the Czech Republic to Poland over three days, which also confirms a responsible approach of the pilot to the task performed.

1.19. Useful or effective investigation techniques

The Commission applied standard investigation methods. During a visual inspection of the occurrence scene, the Police performed a 3D scan of the scene, but it was not used by the Commission.

2. SAFETY RECOMMENDATIONS

No safety recommendation were made at the stage of making the Preliminary Report.