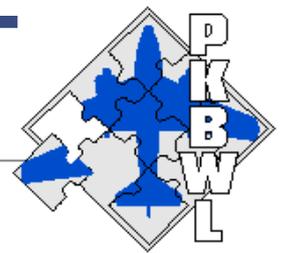


FINAL REPORT



ACCIDENT 2021/1052

State Commission on Aircraft Accidents Investigation (PKBWL)

UL. CHAŁUBIŃSKIEGO 4/6, 00-928 WARSZAWA | DUTY PHONE (+48) 500 233 233

FINAL REPORT

on investigation of an occurrence of an aircraft with MTOW lower than 2250 kg¹

ACCIDENT

OCCURRENCE NO – 2021/1052

AIRCRAFT – Airplane, EV-97 Eurostar SL, OK-YUA98

DATE AND PLACE OF OCCURRENCE – 9 May 2021, EPMX



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.

The investigation may be reopened if new information becomes available or new investigation techniques are applied, which may affect the wording related to the causes, circumstances and safety recommendations contained in the Report.

Investigation into air the occurrence was carried out in accordance with the applicable international, European Union and domestic legal provisions for prevention purposes only. The investigation was carried out without application of the legal evidential procedure, applicable for proceedings of other authorities required to take action in connection with an air occurrence.

The Commission does not apportion blame or liability.

In accordance with Article 5 paragraph 6 of the Regulation (EU) No 996/2010 of the European Parliament and of the Council on the investigation and prevention of accidents and incidents in civil aviation [...] and Article 134 of the Act – Aviation Law, the wording used in this Report may not be considered as an indication of the guilty or responsible for the occurrence.

For the above reasons, any 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

¹ In accordance with SCAAI procedure, this report format is only applicable to light aircraft and does not fully follow the ICAO template contained in Annex 13 to the Convention on International Civil Aviation.

Occurrence reference number:	2021/1052			
Type of occurrence:	ACCIDENT			
Date of occurrence:	9 May 2021			
Place of occurrence:	EPMX (Milewo)			
Type and model of aircraft:	Airplane, EV-97, Eurostar SL			
Aircraft registration marks:	OK-YUA98			
Aircraft user/operator:	Natural person			
Aircraft Commander:	Certificate of professional competence (Pilotni Pukaz)			
Number of victims/injuries:	Fatal	Serious	Minor	None
	-	-	-	2
Domestic and international authorities informed about the occurrence:	Polish Civil Aviation Authority, AAII (Czech Republic), EASA			
Investigator-in-Charge:	Krzysztof Miłkowski			
Investigating Authority:	State Commission on Aircraft Accidents Investigation (PKBWL)			
Accredited Representatives and their advisers:	Not appointed			
Investigation Team:	Michał Ombach			
Document containing results:	Final Report			
Safety recommendations:	None			
Addressees of the recommendations	Not applicable			
Date of completion of the Investigation:	14.12.2022			

1. Type of occurrence

Accident.

2. Investigation Authority

State Commission on Aircraft Accidents Investigation (PKBWL).

3. Date and time of occurrence

9 May 2021, 17:12 hrs LMT².

4. Take off and planned landing location

The airplane took off from the Milewo aerodrome (EPMX). The planned landing place was Płock aerodrome (EPPL).

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

5. Place of occurrence

Grass runway 18, infrastructure of EPMX aerodrome.

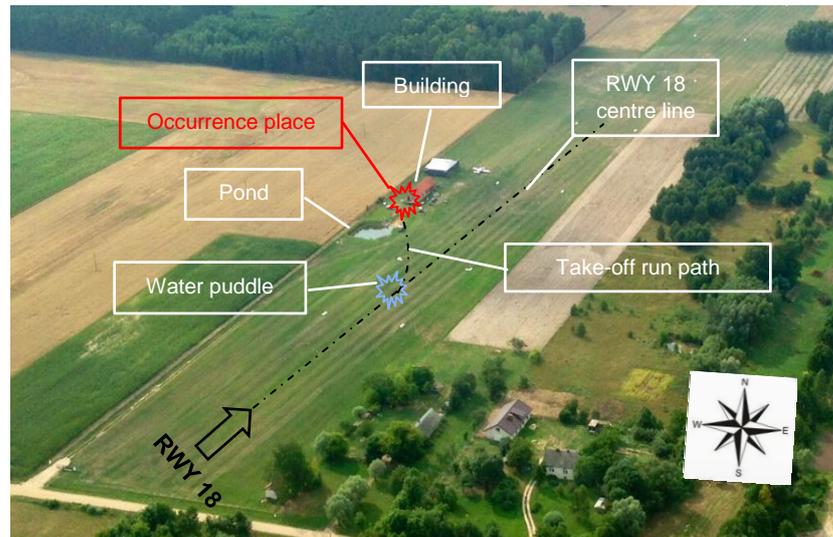


Fig. 1 Milewo Aerodrome (EPMX) – occurrence situational scheme. The intended take-off direction and movement path after loss of direction during take-off run is shown. [source: Internet]

6. Operation type

Private flight.

7. Flight phase

Take-off run.

8. Flight conditions

Daylight, VMC.

9. Meteorological information

CAVOK. A clear summer day, light and moderate wind from SE³.

The weather had no influence on the course of the occurrence.

10. Flight organizer

Private.

11. Crew information

Pilot, holder of the valid Pilotni Prukaz, issued nearly 3 months before the accident; holder of the valid class 2 aeromedical certificate, without limitations. At the occurrence day the pilot declared a total flight time of about 150 FH. He began training on ultralight aircrafts in 2019.

³ Established on the basis of aerodrome CCTV recordings.

12. Injuries to persons

The pilot as well as the bystander on the terrace of the building hit by the aircraft did not suffer any injuries.

13. Damage to aircraft

The aircraft was substantially damaged (Fig. 2)

The right wing and its mounting, the propeller were damaged. The fuselage structure, horizontal stabilizer, elevator and landing gear were seriously damaged. The engine was qualified for maintenance check.



Fig. 2 Aircraft damage caused by collision with building [source: PKBWL]

14. Course and analysis of occurrence

14.1. Occurrence course

On 9 May 2021, three ultralight planes made a flight from EPPL to EPMX aerodrome. After a short break, two of them took off for next flights. The last one – EV97 Eurostar OK-YUA98 aircraft, initiated take-off run to perform a return flight to EPPL.

During take-off run on RWY 18, still below rotation speed, the aircraft hit a vast puddle of water. The airplane lost take-off direction and turned left, towards the pond and the building. At full take-off power the aircraft bypassed the pond and the right-wing tip collided with the against the terrace balustrade, while the wing torsion box hit the vertical beam supporting the roof of the building (Fig. 3). Then the airplane made a full vertical rotation and rested on the property's fence, damaging it. The engine of the plane stopped and there was no fire.



Fig. 3 Aircraft position after collision with the building and fence [source: PKBWL]

14.2. Analysis

The analysis was carried out based on PKBWL findings, pilot's and aerodrome operator's statements and CCTV recording. Two cameras located above the terrace comprehensively recorded the course of the take-off and collision with the building.

The grassy runway of the EPMX aerodrome is situated in the direction of 180/360 degrees and has longitudinal ditches to the east and west side (Fig. 4). The drainage of rainwater consists only in its dripping under the influence of gravity, and the unevenness of the runway surface may create local puddles.

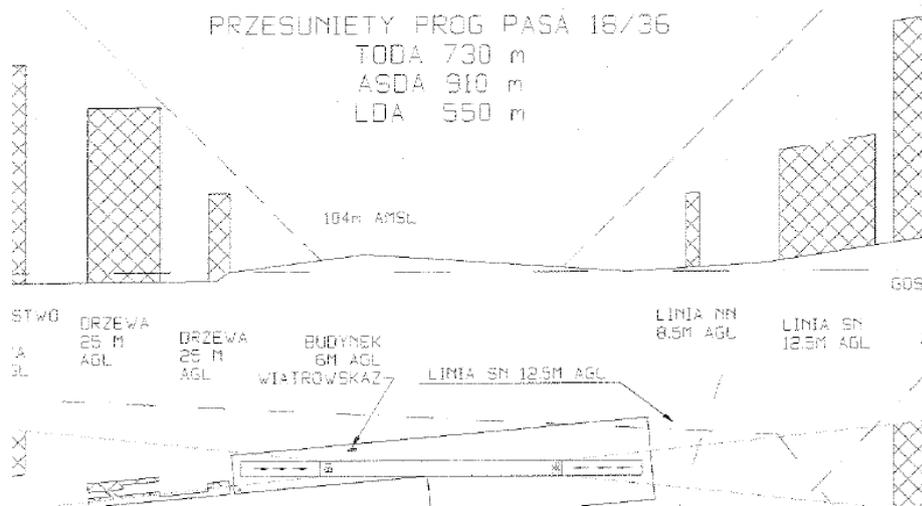


Fig. 4 Profile of the EPMX runway. [source: aerodrome operational manual, http://milewo.pl/milewo/docs/IUL_Milewo_BW.pdf]

On the day of the accident, a puddle of water softening the surface, covered about 1/3 of the runway length from the runway 18 threshold, centrally in the take-off run direction (Fig. 5).



Fig. 5 a) Puddle of water on the runway and visible wheel tracks of airplanes on the day of the accident; b) Aircraft take-off. In the zoomed-in frame, a splash is seen during the aircraft movement through the puddle [source: PKBWL]

On the day of the accident, a puddle of water softening the surface, covered about 1/3 of the runway length from the runway.

At 17:12:40 LMT the pilot initiated the take-off run and for the first 5 seconds, until entering the puddle of water, he kept the required direction along the runway center line. At that time, the speed was not sufficient to leave the ground (below the rotation speed), but the aerodynamic force growing on the wing caused that the contact of the wheels with the ground decreased significantly. After entering the puddle, after

a temporary slowdown, aquaplaning⁴ occurred, and the plane - under the influence of the propeller torque - began to turn strongly towards the pond and buildings, changing its direction by about 45 degrees. During and just after passing the puddle, the pilot did not prevent the loss of direction. First of all, he did not abort the take-off, despite such a significant disturbance of its trajectory occurred. The first and only applying of the rudder is observed only 9 seconds after the start of the take-off (Fig. 6). It is firm, full and combined with the aircraft rolling to the right wing, which is the result of the of a centrifugal force occurring during direction change (in a turn). The airplane rolled and the right-wing tip hits the runway surface, which is seen on the video (Fig. 6).



Fig. 6 The aircraft rolling on the wing after losing direction. The dashed red line shows the correct, but not maintained take-off run direction [source: PKBWL]

After passing the puddle, the forward speed of the airplane increased and approached the value of rotation speed. In this configuration, the contact of the wheels with the ground was already minimal. The plane was moving partially with a traverse: it passed a pond, turned a few degrees right, then left and hit the building. The analysis of video materials shows that the pilot tried to counteract the loss of direction only by deflecting the ailerons (Fig. 7). This way of counteracting the loss of direction and regaining control of the situation could not be effective in any way.

⁴ Aquaplaning - a phenomenon consisting in the formation of a water wedge at the contact of a tire with a wheel moving on a wet surface, when excess water cannot be drained through the tire tread. The result is the loss of adhesion of the tire to the surface and difficulty or impossibility to maintain traction (direction of movement).



Fig. 7 Moments before the collision with the building: the applied left upper aileron and neutral rudder is visible [source: PKBWL]

Until the collision, the plane was accelerating continuously at full take-off power. According to the pilot's statement the power knob was stuck in the "full" position and the pilot was unable to move it.

In the accident aircraft, the manufacturer equipped both knobs (propeller pitch control and power control) with brake mechanisms, allowing the position of the knob to be set in any position desired by the pilot (Fig. 8). The brake grip is located at the base of each knob, in the plane with the instrument panel.

Over tightening the brake makes it difficult or impossible to move the knob as long as the clutch release button is not pressed and held. Despite the twisted brake, the design of the knob allows precise forward/backward movement. However, this system does not work when a quick and extensive reduction (or increase) of rotation is required.

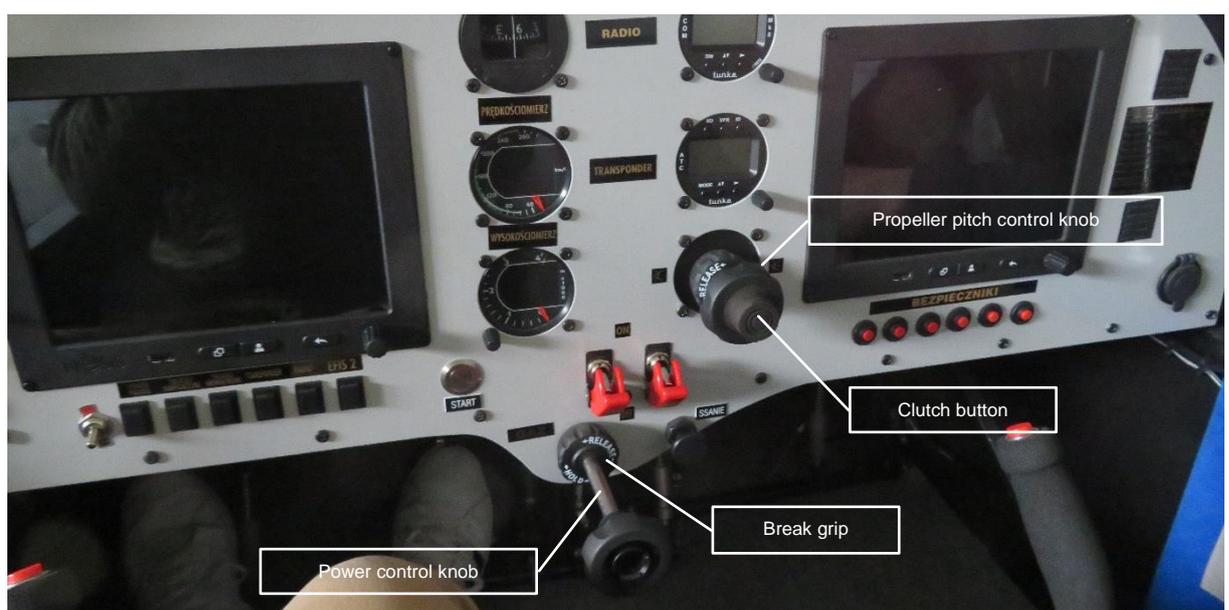


Fig. 8 Power control and propeller pitch control knob location on the instrument panel of EV-97 Eurostar SL aircraft [source: PKBWL]

By setting the power control knob to the maximum forward position (pressed knob) for take-off, it is highly probable that the pilot set it while applying the brake on the knob, or did not loosen the brake before initiating take-off. The take-off took place under full power (take-off power) conditions. The footage from two CCTV cameras shows that the pilot, when approaching the building and during collision, had his right hand on the power control knob. However, he did not withdraw his elbow (no backward movement of the hand) in order to reduce the rotation.

The fact that he could have had problems with pulling the knob is evidenced by the fact that - when struggling with it - the button for quick unlocking it broke off (Fig. 9).

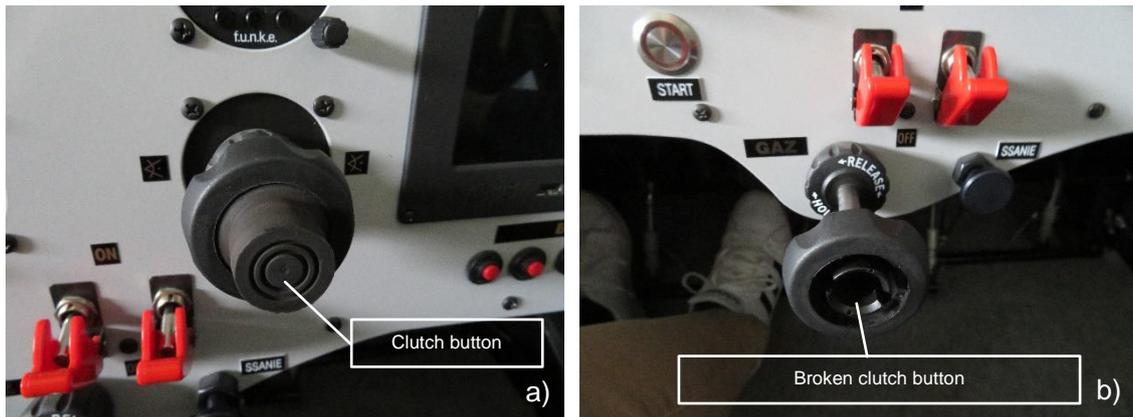


Fig. 9 Knobs: a) not damaged (propeller pitch control), b) damaged (power control)

The direct cause of the accident was failure to control the aircraft during the take-off run phase, after a disturbance – passing through a large puddle, aquaplaning and loss of direction. Each of these factors should have determined the pilot to immediately abort the take-off and take all possible measures and efforts to avoid collision with obstacles on the aerodrome, that could result in the most serious consequences. These could be at least injuries of bystanders (Fig. 10) and a fire (including a building fire) that did not occur.



Fig. 10 A man was on the terrace during the collision with the building. The video recording shows the slight distance between the wing and this person. [source: PKBWL]

Apart from problems with handling of the throttle, the pilot did not take any other measurable steps to stop/slow down the plane (e.g. by turning off the magnetos) or to change the direction of the aircraft movement (by firmly, fully applying the rudder). The pilot was also not prepared to perform flights from EPMX. The pilot clearly did not recognize and did not consider the terrain conditions for take-off after landing at Milewo, including the condition of the runway (slopes) and the presence of a large puddle of water. As part of the take-off procedure, he did not analyse the procedure of an aborted take-off (so-called eventualities), and the preparation of the cockpit for take-off (pre-start check) was also inappropriate (mistakenly or technically blocked power control knob brake).

14.3. Findings

- 1) The pilot had proper license to perform the flight
- 2) The aircraft had the proper documentation and insurance;
- 3) The loading (take-off weight) and longitudinal balance (center of gravity) did not affect the incident;
- 4) The pilot did not comply with the AIP guidelines regarding the need to reconcile arrivals with the aerodrome operator. The landing and take-off attempt were performed outside the aerodrome operating hours specified in the AIP;
- 5) The pilot and the bystander (in the collision with building place) did not suffer any injuries;
- 6) The aircraft was substantially damaged;
- 7) The building and the fence of the property were also damaged.

15. Cause of the accident

- 1) Failure to regain control of the aircraft during take-off run, after loss of direction;
- 2) Lack of decision to abort take-off after loss of control during take-off run.

16. Contributing factors

- 1) Failure to recognize the terrain conditions for landing and take-off at the aerodrome (dodge and a large puddle on the runway);
- 2) Insufficient pre-flight check of the cockpit and thoughtless approach to possible actions in case of aborted take-off.

17. Safety recommendations

PKBWL has not proposed any safety recommendation after completion of the Investigation.

18. System changes proposals

None.

19. Annexes

None.

THE END

Investigator-in-Charge

.....
(Signature on original)