



State Commission on Aircraft Accidents Investigation (PKBWL)

FINAL REPORT

2022/5615

OCCURRENCE NUMBER

ACCIDENT

FUEL: ACCIDENT RELATED TO FUEL

CFIT: Controlled flight into terrain



The sole purpose of both the investigation and the Final Report is to prevent aviation accidents and incidents.

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

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

Aeroklub Zagłębia Miedziowego
Socata-Groupe Aerospaciale, Socata-Ralley 235
E-D airplane, SP-WOP
Lubin, 24 September 2022

This Final Report was issued by the State Commission on Aircraft Accidents Investigation (PKBWL) on the basis of information available on the date of its publication.

This Report presents the circumstances of the aviation occurrence concerned, as well as its causes, contributing factors and safety recommendations.

This Report was drawn up in Polish.

Warszawa, 20 December 2023



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INTRODUCTION

LEGAL BASIS

State Commission on Aircraft Accidents Investigation is the 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 (Office Journal of the EU L 295 of 12 October 2010, p. 35, as amended).

The Commission shall conduct investigations on the basis of the provisions of the Aviation Law of 3 July 2022 (Journal of Laws 2022 No. 130, item 1112, as amended) and law of the European Union in the field of civil aviation accidents and incidents, and taking into account the standards and recommended methods of conduct contained in Annex 13 to the Convention on International Civil Aviation, drawn up in Chicago on December 7, 1944 (Journal of Laws of 1959, item 212, as amended).

KEY INFORMATION ON THE OCCURRENCE

Operator (user), No. or flight type – Aeroklub Zagłębia Miedziowego.

Manufacturer, type, model, aircraft identification – Socata-Groupe Aerospatiale, Socata-Ralley 235 E-D airplane, SP-WOP.

Place and date of occurrence Lubin, 24 September 2022

OCCURRENCE REPORT

PKBWL was notified on the occurrence under the mandatory occurrence reporting system, on 24 September 2022.

The occurrence was assigned a registration number – 2022/5615.

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

The classification was not changed in the course of the investigation.

OCCURRENCE NOTIFICATION

- EASA;
- European Commission;
- ULC

ORGANISATION OF THE INVESTIGATION

The investigation was conducted by – the PKBWL.

Investigation supervisor (IIC) – Jacek Bogatko.

Specialist groups – no specialist groups were appointed.

RECOMMENDATIONS

Unless otherwise specified, the recommendations contained in this Report are addressed to the regulatory authorities of the state concerned. The decision on how to proceed is the responsibility of those authorities. Details are provided in section 4 of this report.

TIME

Time in the Report is provided as LMT. LMT on the occurrence day = UTC+2.

DATE

Where a date is provided in this Report in a digital format, the respective digits represent DD/MM/YYYY, where DD means day, MM means month, and YYYY means year.

FIGURES AND TABLES

Unless otherwise specified in this Report, the PKBWL is the source.

ABSTRACT

On 24 September 2022, a gliding competition for landing accuracy was held at Lubin airport (EPLU). The gliders were towed behind the Socata-Ralley 235 E-D aircraft with identification marking SP-WOP. After completing 20 tows, the tow pilot was changed.

During the first tow (after the pilot change), the tow pilot disconnected the tow rope at an altitude of approximately 300 m. The aircraft pilot deviated the direction of flight to the left and began a descent. By radio, he obtained permission from flights manager to land downwind. While making a right turn to the airport, the pilot attempted to increase the engine speed, but the engine did not respond. As a result, the aircraft made an emergency landing approximately 180 m before the RWY 31 threshold.

During the final phase of the approach to the emergency landing, the aircraft snagged and broke the electric traction wires of the railway line.

The pilot was not injured during the accident and the aircraft was severely damaged.

SYMBOLS, ACRONYMS AND ABBREVIATIONS

SYMBOLS

| | |
|---|---|
| ° | Degree e.g. °C (temperature) and 1° (angle) |
| ' | minute |
| ” | second |

ACRONYMS AND ABBREVIATIONS

| | | |
|--------|-------------------------|----------|
| | | A |
| AMSL | Above mean sea level | |
| | | C |
| C | Degrees Celsius | |
| | | F |
| ft | Foot/feet | |
| | | H |
| h | Hour/hours | |
| | | I |
| FOM | Flight Operating Manual | |
| | | K |
| kg | Kilogram(s) | |
| kHz | Kilohertz | |
| FM | Flight manager | |
| km | Kilometre(s) | |
| km / h | Kilometres per hour | |
| kt | Knot / knots | |

M

m Meter(s)

P

PPL(A) Private pilot license

R

RWY Runway

S

SEP(L) Single Engine Piston (Land)

SPL Sailplane Pilot License

V

VML valid only with correction for defective distant, intermediate and near vision

1. FACTUAL INFORMATION

1.1. History of the flight

On 24 September 2022, a gliding competition for landing accuracy was held at Lubin airport (EPLU). The gliders were towed behind the Socata-Ralley 235 E-D aircraft with identification marking SP-WOP. After completing 20 tows, the tow pilot was changed.

According to the pilot, he performed a pre-flight inspection after taking over the aircraft from the previous pilot. At the time of handing over the aircraft, the fuel valve lever was set to the 'right tank' position, which contained more fuel. After starting the engine, the pilot warmed it up and, after obtaining (by radio) permission from the flight flights manager, taxied up in front of the glider. At 11:35 am, the team (tow plane – glider) took off. At an altitude of about 300 m, the glider pilot unhooked the tow rope and started flying on the right circle. The aircraft pilot deviated the flight direction to the left and began a descent. He had then executed an extended right turn in an easterly direction (Fig. 1). During the descent, he reduced the throttle by 1/3, switched on the electric fuel pump, moved the carburettor heater lever to the on position. He then reduced the throttle to minimum, switched the propeller pitch lever to low pitch and proceeded to glide flight. At the same time, by radio, he obtained permission from the flight manager to land downwind, in the direction of grass strip 31. While making a right turn, the pilot found that the aircraft was too low and tried to increase the engine speed (to increase its RPM), but the engine was unresponsive – as if it was throttling up.

He moved the power lever several times. As he stated, at first, he thought that the carburettor had become iced up. The pilot checked the position of the carburettor preheat lever, which was in the 'preheat on' position. He again tried to increase engine RPM, which failed. The pilot switched the engine fuel supply to the left collector intake and ensured that the electric fuel pump switch was in the on position. The pilot again unsuccessfully tried to increase the engine speed. There were allotment gardens in front of the aerodrome on the flight direction, a railway line was running and trees were growing. The pilot failed to unhook the tow rope. When he found he would not reach the airfield, he opened the small flaps to land at the lowest possible speed. The aircraft flew over the allotments. Flying over the electric traction running above the railway line, the aircraft was already configured for landing. The pilot did not feel the aeroplane breaking the electric traction wires, however, after touchdown he felt a jerk, the aeroplane tilted forward and came to an abrupt halt (Fig.1, 2). As the pilot stated, after landing, he turned off the master switch and closed the fuel valve. The pilot stated that he was not injured during the occurrence, so he left the aircraft cabin and stood on the wing. He heard the sound of sparks from the broken electric traction. He unhooked the tow rope, which was suspended on the wires. The pilot made sure the fuel was not leaking and there was no risk of fire. He turned on the master switch and then the radio and informed the flight manager (FM) that he was OK and switched off the power again. He also communicated the incident to FM by telephone.

The emergency services (who arrived on the scene within a short time) and the PKBWL were notified of the occurrence.



Figure 1. Approximate sketch of airplane flight trajectory



Figure 2. Socata-Ralley 235 E-D airplane at place of emergency landing

1.2. Injuries to persons

Table 1. General summary of the number of injuries

| Injuries | Crew | Passengers | Total on board the aircraft | Other |
|--------------|------|------------|-----------------------------|----------------|
| Fatal | 0 | 0 | 0 | 0 |
| Serious | 0 | 0 | 0 | 0 |
| Minor | 0 | 0 | 0 | Not applicable |
| None | 1 | 0 | 0 | Not applicable |
| TOTAL | 1 | 0 | 0 | 0 |

1.3. Damage to aircraft

As a result of the occurrence, the aircraft was destroyed (Fig. 3) The front landing gear strut and right main landing gear were broken off. The propeller, the front part of the fuselage, the tip of the right wing and the left wing were damaged. The elevator was slightly damaged.



Figure 3. Socata-Ralley 235 E-D – aircraft wreck (visible damage to the structure)

1.4. Other damage

During the final phase of the emergency landing approach, the aircraft broke the wires of the railway electric traction line (Fig. 4).



Figure 4. Damaged railway electric traction line
[source: Aero Club Zagłębia Miedziowego]

1.5. Personnel information

Pilot-in-Command.

Pilot: male, aged 57.

Licence: PPL(A) – Private Pilot License (Aeroplane).

Ratings endorsed in the licence:

- SEP(L) valid until 30 June 2024;
- towing gliders;

The pilot the SPL glider pilot licence.

Ratings endorsed in the licence:

- limited aerobatics;
- instructor.

Total flight time: 1338 h 46 min, including on aircraft: 352 h 33 min, as pilot-in-command 301 h 39 min.

Type flight time:

- Socata-Ralley 235 E-D – 3 h 7 min. in 29 flights (not including the flight that ended in an accident).

Flight time before the incident:

- in the last 24 h 0 h;
- in the last 7 days: 0 h.
- in the last 90 days: 25 h 12 min.

Practical skills check – valid until 30 May 2023

Aero-medical certificate with VML restriction

- Class 2 valid until 21 July 2023;
- LAPL valid until 30 June 2024.

Rest during the last 48 h – the pilot was provided with an opportunity to rest in home conditions.

Cockpit seat – the pilot was occupying the left seat at the time of the occurrence.

The pilot was certified to fly on Socata-Rallye 235 E-D airplane on 1 May 2022 and performed 14 flights.

Further 15 flights on Socata-Rallye 235 E-D airplane he performed on 22 June 2022.

1.6. Aircraft information

1.6.1. Airworthiness and maintenance

a) General information:

Socata-Ralley 235 E-D is a single-engine, four-seat, metal short take-off and landing low-wing aircraft (Fig.5). The aircraft is equipped with dual control system. Fixed tricycle landing gear with the front wheel 9.74 m wing span is equipped with slotted ailerons, Fowler flaps and automatic slats. The aircraft height is 2.8 m and its length is 7.24 m. The aircraft is equipped with Lycoming O-540 engine with power of 235 KM.

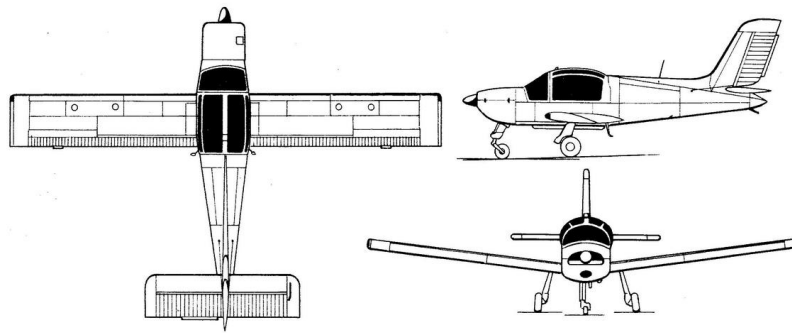


Figure 5. Socata-Rally [source: Internet]

- manufacturer – Socata – Groupe Aerospatiale;
 - factory designation (model) – Socata-Ralley 235 E-D;
 - factory (serial) number – 12707;
 - year of manufacture – 1976;
 - registration marks – SP-WOP;
 - owner – Aero Club Zagłębie Miedziowe;
 - user – Aero Club Zagłębie Miedziowe;
 - certificate of registration – date of entry 27 April 2016, – register number 4937 – valid on the day of the occurrence;
 - CofA – issued 15 May 2016 – valid on the day of the incident.
- b) History of the aircraft:
- Total flight time since new– 4183 h 34 min.;
 - Total flight time since the last inspection – 18 h 18 min.;
 - modifications – none;
 - on-board technical logbook – maintained dutifully;
 - maintenance documentation – maintained dutifully;
 - Airworthiness Directives – performed;
 - Service Bulletins – mandatory bulletins have been implemented.
- c) Engine and propeller:
- engine Lycoming O-540 B4B5, manufacturer: Lycoming Engines, operating time: since the beginning of the operation: 10003 h 10 min, since the last general overhaul 1670 h 44 min., since the last periodic inspection 75 h 8 min.;
 - propeller model HC-C2YK-1BF/F8468A-4, manufacturer Hartzel Propeller, working time: since the beginning of the operation 10003 h 10 min., since the last general overhaul 1670 h 44 min., since the last periodic inspection (C1) 75 h 8 min.

d) Fuel:

- recommended – AVGAS 100 LL;
- used in flight – AVGAS 100 LL;
- quantity on board – 95 kg;
- distribution on the deck – evenly in both wing tanks.

e) Aircraft load:

- Maximum Take-off Mass (MTOM) – 1200 kg;
- Empty Aircraft Mass – 737.2 kg;
- Fuel mass – 95 kg;
- Oil mass – ~10 kg;
- Pilot mass with a parachute – 83 kg;
- Aircraft take-off mass – 925,2 kg;

1.7. Meteorological information

Weather forecast GAMET:

FAPL22 KRAK 240300

EPWW GAMET VALID 240400/241000 EPKK-

EPWW WARSAW FIR/A2 BLW FL150

SECN I

SFC VIS: 04/06 S OF N5130 LCA 4000M BR

ICE: 04/10 NE OF LINE EPZG-EPOP LCA MOD FL050/070

04/10 W OF E017 LCA MOD ABV FL100

SIGMET APPLICABLE: AT TIME OF ISSUE NIL

SECN II

PSYS: 06 H 1023 HPA OVER BALKANS MOV S NC

RIDGE OVER E POLAND STNR WKN

COMPLEX OF L 1012 HPA OVER SCANDINAVIA AND BENELUX MOV NE SLW

NC

AND SHALLOW TROUGH OVER W POLAND STNR NC

SFC WIND: 04/10 160/05KT

WIND/T: 04/10

1000FT AMSL 180/10KT PS11

2000FT AMSL 180/10KT PS10

3300FT AMSL 180/10KT AND LCA VRB/05KT PS06

5000FT AMSL W OF E016 260/05KT PS03

E OF E016 190/07KT PS02

10000FT AMSL W OF E017 290/10KT MS03

E OF E017 270/10KT MS03

CLD: 04/10 LCA SCT/BKN SC 5000/7000FT AMSL

04/10 W OF E017 SCT-BKN AC AS 10000/ABV 15000FT AMSL

FZLVL: 04/10 FM SW PART 8000FT AMSL TO NE PART 5500FT AMSL

CHECK AIRMET AND SIGMET INFORMATION

Explanation of the most important elements of the weather forecast at an altitude of 1000 ft:

- time: 04:00 to 10:00 UTC (06:00 to 12:00 LMT);
- wind direction: 180°;
- wind speed: 10 kt (5,4 m/s);
- cloud cover: from 5/8 to 7/8, cloud ceiling 5000/7000 ft AMSL;
- ambient temperature: 11°C

1.8. Navigational aids

The pilot did not use navigational aids during the flight.

1.9. Communications

The pilot kept radio correspondence with the flight manager. The correspondence in both directions was clear.

1.10. Aerodrome information

The Lubin Aerodrome (EPLU) – aerodrome available for public use – not subject to certification, operated by the Aero Club Zagłębie Miedziowe (Figure 6).



Figure 6. Lubin aerodrome

1.11. Flight data recorders

The aircraft was not equipped with cockpit flight data recorder.

1.12. Wreckage and impact information

The pilot made an emergency landing approach from the east direction, from above the garden allotments. In the vicinity of garden allotments, there was no suitable place to make a safe emergency landing. The pilot attempted to reach the airport. In the final phase of the flight, he raised the aircraft's nose, which caused a drop in speed. In order to land at a lower speed, the pilot deployed the take-off flaps. Prior to touchdown, the aircraft mushed to the left wing. Touchdown occurred about 30 meters behind the railway line. After touchdown, the aircraft turned to the left and stopped after a short landing run about 180 m before the threshold of runway 31, deviated from the landing direction by about 45° (Fig. 7). Since the pilot did not disconnect the tow rope, it hung on the electric traction wires (Fig.4).



Figure 7. Place of occurrence

Due to the occurrence, the fuel valve was locked in the closed position.

No aircraft part separated from it before touchdown.

1.13. Medical and pathological information

The pilot did not sustain any injuries during the occurrence.

The pilot was not under the influence of alcohol.

1.14. Fire

There was no fire during the occurrence.

1.15. Survival aspects

During the occurrence, the pilot had his seatbelts properly fastened and firmly tightened.

The aircraft mushed and tilted onto the left wing. The touchdown and breaking off of the left landing gear strut absorbed the forces acting on the pilot's body during the crash.

1.16. Tests and research

The day after the occurrence, the PKBWL, with the participation of an aircraft mechanic, performed an aircraft visual inspection.

During the inspection, the following activities were performed and the following was found:

- a) 130 litres AVGAS 100LL fuel were sucked from the aircraft tanks;
- b) the fuel filter was unscrewed. The filter cartridge was clear with a small amount of fuel and a small amount of solid contaminants;
- c) the oil cooler was removed to gain access to the carburettor;
- d) no fuel was found in the fuel line;
- e) the air inlet to the carburettor was clean and unobstructed;
- f) the fuel drain plug in the carburettor was unscrewed and a small amount of fuel was poured down;
- g) a small amount of fuel was found in the float chamber of the carburettor;
- h) neither contaminants nor water were found in fuel sucked from the carburettor;
- i) spark plugs were removed and their technical condition was good;
- j) the fuel valve was blocked in the closed position during the accident and it was possible to unblock it with a lot of force;
- k) the operation of the electric fuel pump was checked and it was in working order;
- l) the operation of the mechanical fuel pump was checked and it was in working order.

1.17. Information on organizations and management

Organization of flights – On September 24, 2022, a gliding competition for landing accuracy, organized by the Aerocub of Zagłębie Miedziowe, was held at Lubin Airport (EPLU).

The flights took place from RWY 13R and a "square" was designated and a flight manager was appointed.

1.18. Additional information

1.18.1. Prior to the publication of the final report, PKBWL consulted on its draft, requesting comments from interested persons, entities and bodies, including EASA:

- a) the aircraft commander involved in the accident, does not make comments on the circumstances and causes of the accident;
- b) Aero Club Zagłębie Międzyowe –does not make any comments;
- c) the translated draft of the final report was submitted to: EC, EASA, NTSB and BEA. None of the above made comments on the draft final report.

1.19. Useful or effective test methods

Standard investigation techniques were applied.

2. ANALYSIS

2.1. General Provisions

Based on the analysis of the facts collected at the place of the accident, PKBWL has decided to conduct a full investigation of the accident resulting in the Final Report.

2.2. Aircraft

2.2.1. Aircraft maintenance

The aircraft had a valid certificate of registration and airworthiness and was operated in compliance with regulations.

2.2.2. Operation of the aircraft

At the time the pilot collect the aircraft, it was operational and airworthy.

No malfunction or failure of the aircraft was found that could have contributed to the accident.

2.2.3. Mass and balance

The mass and centre of gravity of the aircraft were within the limits specified by the IUwL.

2.3. Flight operations

2.3.1. Pilot's qualifications

The pilot was qualified to perform the flight. The pilot's last flight before the accident on the Socata-Rally 235 E-D aircraft was performed on June 22, 2022, i.e. three months before the accident. Taking into account the number of flights performed (29), hours flown (3 h 7 min) and a break in flying, it can be assumed that the pilot's experience in flying this aircraft type was limited.

2.3.2. Flight analysis

Operating the fuel valve lever As the pilot stated, he took the aircraft into flight with the fuel valve lever set to the right tank. After an unsuccessful attempt to increase engine speed, he checked whether the electric fuel pump was on, moved the fuel valve lever to the "left tank" position and again tried to increase engine speed which failed. According to the statement, he closed the fuel valve after the emergency landing.

Since there was a small amount of fuel in the engine fuel system and in the float chamber of the carburettor, it can be concluded that the fuel valve was closed before the emergency landing.

During the inspection of the aircraft after the occurrence, the fuel valve lever was locked in the "closed" position. It was possible to turn to the "open" position with a lot of force (Fig. 8) Most likely, the valve locked during the emergency landing due to structural deformation. This indicates that the fuel valve was closed during the flight before the emergency landing.

Figure 8.
Location of the fuel valve lever after the occurrence.
Attempt to change the location of the fuel valve lever.



As stated during the inspection, both fuel pumps were in working order. The pilot stated that after releasing the glider, inter alia., he turned on the electric fuel pump. If he had correctly switched on the fuel tank to the left one, there should have been fuel in the engine fuel system and in the float chamber of the carburettor.

The fuel consumption of the Lycoming O-540 B4B5 engine at reduced RPM during descent is approx. 1 l/min. It can be estimated that after closing the fuel supply, the fuel system would have fuel for about 30 seconds of operation.

The pilot's seat was moved as far forward as possible. Since the fuel valve lever is located under the notch in the centre panel (Fig. 8), controlling its position was difficult. After releasing the glider, the pilot most likely unconsciously closed the fuel supply to the engine.

Maneuver for landing. After releasing the glider, the pilot made a left turn and then a right turn. The pilot had performed few flights on this aircraft type and had a long break in flying on this aircraft type. The right turn was executed so that the airplane moved away from the airport, allowing for an approach with a longer final.

Had the pilot performed a right turn closer to the airport, he would have made an emergency landing at the airport (Fig.9).

- 3.1.8. After the accident, a visual inspection of the aircraft was performed – the findings are described in section 1.16.
- 3.1.9. The pilot was licensed to perform the flight.
- 3.1.10. The pilot had little experience in flying Socata-Ralley 235 E-D airplane.
- 3.1.11. The pilot had a class 2 medical certificate within the validity period.
- 3.1.12. During the occurrence, the pilot had his seatbelts properly fastened and firmly tightened.
- 3.1.13. Most likely, after releasing the glider, the pilot unconsciously closed the fuel supply to the engine, which led to its stall.
- 3.1.14. The right turn to the airport was extended in an easterly direction.
- 3.1.15. The aircraft made an emergency landing on the eastern side of the airport, within 180 m from threshold RWY 31R.
- 3.1.16. Had the pilot performed a right turn closer to the airport, the emergency landing would have taken place at the airport.

3.2. Causes and contributing factors

- 3.2.1. Unintentional closure of the engine fuel supply by the pilot.
- 3.2.2. Execution of a right turn for final, too far from the airport.

4. SAFETY RECOMMENDATIONS

Not formulated.

5. APPENDICES

None.