**STATE COMMISSION ON AIRCRAFT ACCIDENT INVESTIGATION**

# FINAL REPORT

ACCIDENT

## Occurrence No: 1448/13

**Aircraft:** hot air balloon

Cameron TR 70

9 September 2013 – Zagajewice near Włocławek

*This Report is a document presenting the position of the State Commission on Aircraft Accident Investigation concerning circumstances of the air occurrence, its causes and safety recommendations. The Report is the result of the investigation carried out in accordance with the applicable domestic and international legal provisions for prevention purposes only. The investigation was conducted without the need of application of legal evidential procedure. In connection with the provisions 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 repealing Directive 94/56/EC (EU Journal of Laws L. 2010.295.35), the wording used in this Report may not be considered as an indication of a person guilty or responsible for the occurrence. The Commission does not apportion blame or liability. In connection with the above, any form of use of this Report for any purpose other than air accidents and serious 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 2014**

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# GENERAL INFORMATION

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|---|---|
| Type of occurrence : | **ACCIDENT** |
| Type and model of aircraft: | **balloon: Cameron TR 70** |
| Aircraft registration marks: | **LX-BNB** |
| Aircraft Commander: | **balloon pilot** |
| Flight organizer: | **Aero Club of Włocławek** |
| Aircraft user: | **private** |
| Aircraft owner: | **private** |
| Place of occurrence : | **Zagajewice near Włocławek** |
| Date and time of occurrence: | **9 September 2013; 6:52 hrs. LMT** |
| Damage to the aircraft: | **none** |
| Injuries to the crew: | **serious injuries** |

# SYNOPSIS

The pilot performed a flight within the framework of 18th Hot Air Balloon European Championship. Having completed three tasks assigned to this flight, the pilot decided to land. At a height of about 2 m he leveled the balloon flight and pulled the line of the parachute valve. During the touchdown the pilot suffered serious injuries.

Investigation into the occurrence was conducted by the SCAAI Investigating Team in the following composition:

Tomasz Kuchciński - Investigator-in-Charge,
Piotr Lipiec - Team Member.

During the investigation SCAAI determined the following cause of the air accident:

An incorrect body position adopted by the pilot in the basket during the landing.

After closing the investigation SCAAI has not proposed any safety recommendations.

# 1. FACTUAL INFORMATION

## 1.1. History of the flight.

The pilot of the balloon with registration marks LX- BNB participated as a competitor in the 18th Hot Air Balloon European Championship. At the briefing before the flight the competitors received information about the competition and the meteorological conditions. The western part of the Kruszyn (EPWK) aerodrome was designated as a common launch point for all competitors. The balloons took off in the conditions of a fairly strong wind. After take off at 6:20 hrs LMT the LX- BNB balloon flew in the North – West direction at an altitude of 20 to 250 m AGL in the EA 141 airspace allocated to the Championship.

About 6:40 hrs LMT, having completed three tasks assigned to this flight, the pilot decided to land. He chose a sufficiently large meadow keeping in mind rather high wind speed (as for the balloon). About 200 meters before the planned touchdown place at a height of about 2 m he leveled the balloon flight. He shut off the pilot lights valves and adopted the low body position leaning his back against the windward side of the basket and his left foot on the opposite side. While the balloon began to descend the pilot maximally pulled the line of the parachute valve to deflate the envelope as soon as possible. At this time, he noticed that his left foot got stuck between the lower cylinder strap and the basket floor. About 2 - 3 seconds later there was the balloon touchdown on the meadow selected by the pilot. The basket came to rest about 15 m from the touchdown place. During the touchdown the pilot suffered a broken leg bone.

## 1.2. Injuries to persons.

| Injuries | Crew | Passengers | Others |
|---|---|---|---|
| Fatal | - | - | - |
| Serious | 1 | - | - |
| Minor | - | - | - |

## 1.3. Damage to aircraft.

None.

## 1.4. Other damage.

None.

## 1.5. Personnel information (crew data).

The pilot: male, aged 51, holder of the Private Pilot Licence Aerostat with the instructor rating, issued by the Ministry of Transport of the Grand Duchy of Luxembourg. The Licence was issued in 1997, in accordance with ICAO Annex 1. The Licence and the Aeromedical Certificate were valid on the day of the accident. The pilot was also a holder of the General Radiotelephone Operator's Certificate.

Flight experience as a Commander on hot air balloons: 868 flights during 1050 hrs 15 min. Flight time in 2013: 45 flights during 50 hrs 35 min. The pilot met the Championship rules requirement of having a minimum of 50 hrs flight time as PIC on hot air balloons.

### 1.6. Aircraft information.

Hot air balloon: Cameron, classic envelope type TR 70 of 1982 $m^3$ (70 000 $ft^3$) volume, equipped with a parachute valve. Classic, not partitioned basket. Shadow single burner. During the flight four CB 250 (Worthington) fuel cylinders were in the basket. Board instruments: Flytec 6040 and Dittel FSG 5 radiotelephone.

| Year of manufacture | Manufacturer | Envelope Serial No | Registration marks | Register Number | Register date |
|---|---|---|---|---|---|
| 2009 | Cameron Balloons Ltd. | 11295 | LX-BNB | 1226 | 5 May 2009 |

| | |
|---|---|
| Airworthiness Review Certificate valid until | 10 May 2014 |
| Envelope total flight time since new | 207 hrs. 20 min |
| Total number of flights since new | 168 |
| Last Airworthiness Review date | 30 April 2013 |

Fuel (gas) quantity prior to the flight:

fuel: propane-butane 76 kg;

The fuel (gas) quantity was sufficient to complete the planned flight.

Balloon loading (mass data):

| | |
|---|---|
| empty balloon mass: | 186 kg |
| fuel mass (with cylinders) | 134 kg |
| crew mass (pilot) | 108 kg |
| equipment mass | approx. 5 kg |
| **Total:** | **433 kg** |

Balloon loading for take-off taking into account the ambient temperature: +7ºC, elevation of the takeoff place: approx. 60 m AMSL and the intended altitude not exceeding 400 m AMSL:

| | |
|---|---|
| Maximum permissible weight: | 635 kg |
| Actual weight: | 433 kg |

Takeoff weight of the balloon was within the limits specified in the Flight Manual.

Basket occupancy:

One person flew the balloon. There were also four CB 250 (Worthington) gas cylinders in the basket.

The pilot had more than 0,25 $m^2$ surface of the basket floor required by the Flight Manual.

Technical condition of the balloon:

The pilot stated that prior to the accident the balloon was airworthy.

**1.7. Meteorological information.**

a. Weather forecast for the flight period developed by the meteorologist assigned to the Championship. Valid for 9 September 2013 from 6:00 hrs to 8:00 hrs LMT.

Trough with waving cold front over Eastern Germany moving East. No change. Weakening stationary high pressure 1025 hPa with the centre over Southern Finland.

Wind speed and direction:

| Altitude AGL [ft] | Direction /speed [kt] |
|---|---|
| sfc | 100 / 6-8 |
| 330 | 130 / 26 |
| 700 | 140 / 30 |
| 1000 | 150 / 25 |
| 2000 | 150 / 25 |
| 2600 | 150 / 20 |
| 3300 | 160 / 20 |
| 5000 | 160 / 16 |
| 6500 | 160 / 20 |

Temperature: 7-10°C;

FZLVL: about 12000 ft AMSL

QNH: 1018 hPa

Visibility: 10 km

Inversion: about 600 ft.

A low surface wind speed was expected for the forecast validity period.

b. At the time of the take-off the surface wind was blowing from the South-East at a speed of about 8 kt. Wind gusts of about 10 kt occurred.

c. During the flight the wind speed was about 17 kt at an altitude of about 100 m AGL and about 32 kt at an altitude of about 250 m AGL. The surface wind speed on the landing site was about 10 – 12 kt.

**1.8. Aids to navigation.**

Not applicable.

**1.9. Communications.**

The pilot did not maintain radio communication with Air Traffic Services.

**1.10. Place of the occurrence information.**

Flat meadow a size of about 200 x 300 m. Geographical coordinates of the landing site: N 52º 39’ 34” ; E 18º 46’ 33”.

**1.11. Flight recorders.**

Flight parameters such as altitude, ground speed and geographical position were recorded by a Flytec 6020 logger. The data was recorded every one second.

**1.12. Wreckage and impact information.**

The landing was carried out with the horizontal speed of about 5 - 6 m/s and the descent rate of about 1 m/s. The balloon basket came to rest about 15 m from the touchdown place.

**1.13. Medical and pathological information.**

During the touchdown the pilot suffered a broken leg bone.

**1.14. Fire.**

Fire did not occur.

**1.15. Survival aspects.**

After landing the pilot left the balloon basket unaided. Due to the injuries suffered he called the emergency number 112, but no one was able to speak with him in English, German or French. He remained in the meadow near the balloon waiting for the ground crew to arrive. About 15 minutes after the landing the ground crew arrived and asked two local individuals to call an ambulance. The ambulance arrived about 10 minutes after the call and took the pilot to hospital.

**1.16. Tests and research.**

The logger record was analyzed in terms of time, altitude, horizontal and vertical speed and the balloon route. The pilot statement concerning the circumstances of the accident was acquired.

**1.17. Organizational and management information.**

The Aero Club of Włocławek was the organizer of the Championship. The Sports Director of the Championship decided about feasibility of a flight. In accordance with the Rules of the Championship each pilot made alone the decision on execution of a particular flight.

**1.18. Additional information.**

The Draft Final Report was sent to the Commission on Aircraft Accident Investigation of the State of the Operator - Administration des Enquêtes Techniques and the State of Manufacture of the balloon - Aircraft Accident Investigation Branch.

**1.19. Useful or effective investigation techniques.**

Standard investigation techniques were applied.

**2. ANALYSIS**

The Commission assessed the weather conditions as difficult for the flight due to the large differences in the wind speed (from 5 to 16 m/s) in a relatively small range of

altitude (from 0 to 250 m AGL). When changing altitude the pilot observed the envelope deformations but taking into account his large experience he assessed them as not too large and acceptable.

Based on data from the logger, just before the touchdown the balloon horizontal speed was around 5 - 6 m/s and its descent rate around 1 m/s. The surface wind speed, i.e. the horizontal speed of the balloon was close to the forecast issued prior to the flight.

According to the pilot statement, after leveling the flight at a height of about 2 m and shutting off the pilot lights valves he adopted the low body position which, according to his experience, ensured him a safe touchdown. In the Commission opinion, at this phase of the flight the pilot was not able to abort the landing in order to relieve his foot, which inadvertently got stuck between the lower strap of the cylinder and the basket floor. Landing in the above described weather conditions was dynamic and resulted in the pilot's body movement in the basket, which in combination with the blocked foot caused the injury.

## 3. CONCLUSIONS.

### 3.1. Commission findings.

a) The pilot had the required ratings to perform the flight;

b) The Commission did not raise any concerns regarding the technical documentation of the balloon;

c) The pilot did not raise any concerns regarding technical condition of the balloon;

d) Loading of the balloon was in accordance with the Flight Manual;

e) The flight was performed in difficult weather conditions, but not exceeding the operational limits of the balloon;

f) During the landing the pilot unintentionally positioned his foot in such a way that it got stuck between the lower strap of the cylinder and the basket floor.

### 3.2. Cause of the accident.

An incorrect body position adopted by the pilot in the basket during the landing.

## 4. SAFETY RECOMMENDATIONS.

Having become acquainted with the materials gathered during the investigation the State Commission on Aircraft Accident Investigation has not proposed any safety recommendations.

THE END

Investigator-in Charge

*Tomasz Kuchciński*