

FINAL REPORT

on

investigation of an aviation occurrence with Zenair CH 701SP aircraft,
registered LZ-KLG, operated by GALABITE Ltd air operator, occurred
on 15.10.2005 during landing after training flight in flight maneuvering
area of Shumen airfield



2005

The materials have been classified under state file number 07/15.10.2005 in the archives of the Aircraft Accident Investigation Unit (AAIU).

Operator (AO): GALABITE Sole-Owner Ltd., with a main office in Sofia 1505, 67 Peyachevich Str. and Air Operator Certificate No BG 210, issued on 09.06.2004 and period of validity till 09.06.2006.

Aircraft Manufacturer: Czech Aircraft Works – Czech Republic

National and Registration Marks: LZ-KLG according Certificate for Registration No II-39, issued on 18.03.2005 by the Civil Aviation Administration.

Place and Date of Air Occurrence: Shumen airfield at 13:30 on 15.10.2005.

Notified: Aircraft Accident Investigation Unit (AAIU) at the Ministry of Transport.
A commission has been appointed for investigation of the aviation occurrence by an order RD-08463/27.10.2005 of the Minister of Transport

Type of Flight: Training flight in flight maneuvering area.

The commander of Zenair CH 701SP aircraft, reg. No LZ-KLG, at 13:20 on 15.10.2005 took-off for training flight in flight maneuvering area in vicinity of airfield.

In maneuvering area the aircraft commander have seen a heavy rain, approaching from the western side. The pilot turned to the landing strip immediately, but he came upon the rain area, lost the visual contact with the ground and executed a go-around.

During the second attempt for landing the visibility was very poor because of heavy rain and the landing was done in the middle of landing strip with exceed landing speed.

During the landing run the aircraft leaved the landing strip boundaries, met a transverse embankment 40 – 50 cm high and overturned.

The pilot wasn't injured.

The aircraft was substantially damaged, as per Attachment No 1 and described in Para 1.3.

In accordance with Para 3 of Additional Regulations to Regulation No 13 of the Ministry of Transport of 27.01.1999 about aircraft accident investigation the event was classified as an Accident, Non-fatal.

1. Factual Information

1.1 History of Flight

There is no written document for the training flight, in which the accident occurred.

1.1.1 Flight Number

It was the first flight for the day for the pilot and for the aircraft.

1.1.2 Preparation and description of the flight:

The pilot, holding a valid pilot license, has leased the aircraft with reg. No LZ-KLG from AO GALABITE for execution of training flight in maneuvering area in vicinity of Shumen airfield.

According to the meteorological information received at 11:00, from West to East there was an upcoming warm front, cloud base was 600 – 1000 m and there was a heavy rain in Veliko Tarnovo area. The wind was from 270 – 290° with a speed of 3- 5 m/s.

At 13:00, at the moment of decision for execution of training flight by the private pilot in the region of Shumen airfield the weather conditions were adequate - cloud base at 600 m and visibility of 15 - 20 km.

After pre-flight walk-around of the aircraft, the pilot received a clearance for execution of the flight from Sofia Flight Information Center (FIC).

After take-off clearance the aircraft took-off at 13:20.

After climbing to 500ft and after occupation of maneuvering area at 3-4 km to the East from the landing strip, the pilot observed, that the weather is worsen sharply and intensive rain started with sharp deterioration of the visibility. He headed to landing strip, but during the approach entered into the rain area, lost visual contact with the ground and went about 50 – 60m aside of the landing strip, took decision and executed a go-around.

The pilot made several attempts to establish a visual contact with the ground by descending and established a contact on ground radio station frequency with a pilot-instructor from GALABITE AO and reported the situation. The pilot from ground advised him to attempt a landing, because it was possible the weather to worsen even more.

During the next attempt for landing the pilot established visual contact with landing strip, which was at right hand side, made a maneuver to correct the course in order to reach the landing approach, but the touch-down was executed on the second half of the landing strip due to the constantly worsening visibility and increasing rain intensity.

During the landing run the pilot attempted to stop the aircraft, but the wet ground and the landing strip roughness increased the braking distance and as a result of this the aircraft leaved the landing strip boundaries, came into an un-mowed area, which covered from the pilots field of vision an earth embankment 40 – 50 cm high.

The aircraft came across the obstacle, sharply increased the angle of attack followed by energetic lowering of the nose and after a hit into the ground nosed over and stopped on its back.

The pilot closed the fuel feed and aircraft power supply, managed to free from the harness and to leave the cockpit.

During the occurrence realized the pilot had no injures.

1.1.3 Location of the Occurrence

The accident occurred at 13:30 local time on 15.10.2005 (10:30 UTC), daylight, during landing at Shumen airfield.

1.2 Injuries to Persons

No injuries to persons.

1.3 Damage to Aircraft

During the inspection after the occurrence, performed by representatives of the Aircraft Accident Investigation Unit, the following damages and destructions to the aircraft were established:

- propeller blades destroyed;
- fore strong frame destroyed, which forms the fore wall of the aircraft fuselage;
- nose landing gear attachment destroyed;
- bottom fuselage skin deformed, immediately behind the nose wheel;
- fuselage frame, immediately behind the nose wheel, deformed;
- lower surface skin of right-hand wing deformed;
- two struts of right-hand wing deformed;
- fore strut to the right-hand wing attachment destroyed;
- fuselage skin behind the right-hand door of the cockpit deformed;
- right-hand wing assemblies of the flaperon deformed;
- attachment points for right-hand wing to the fuselage destroyed;
- attachment of the vertical stabilizer to the fuselage destroyed, in result of this it was attached by flight controls connections only;
- left-hand part of the fuselage behind the cockpit door deformed;
- lower surface skin of left-hand wing deformed;
- left-hand wing slat deformed.

The damages of the different aircraft parts are shown in Attachment No 1.

1.4 Other Damages

No other damages.

1.5 Personnel Information

1.5.1 Commander – male, aged 51, with valid PPL license and medical certificate.

1.6. Aircraft information

1.6.1. Airworthiness information

Zenair CH 701SP aircraft, serial No 7-9676, registration No LZ-KLG was manufactured by Czech Aircraft Works in Czech Republic and has a Certificate of Airworthiness No II-39, issued by CAA, certifying airworthiness from 22.03.2005 till 21.03.2006 and aircraft registration II-39 from 18.03.2005.

The aircraft has accumulated 95:35 hrs since new and 280 cycles since new.

The aircraft is powered with a Rotax 912ULS engine serial No 5644268. It has accumulated 95:35 hrs since new.

The aircraft has been maintained according the Maintenance Program approved by CAA.

According to the aircraft technical logbook on 15.10.2005 a daily check was performed, the aircraft was refueled with 88 l (64kg) and it was accepted according to the procedure without defects and pilot's remarks written.

On the basis of the abovementioned a conclusion may be drawn, that at the moment of the aviation occurrence the aircraft was in airworthy condition.

1.6.2. Airplane performance

The maximum take-off weight of the airplane in accordance with the Certificate of Airworthiness No II-39/22.03.2005 is 500 kg.

According to the AOM the empty weight of the aircraft is 285.7 kg. The aircraft was refueled with 64 kg and there was one pilot on-board, whereat the take-off weight before taking-off from Shumen airfield was about 449 kg and the centre of gravity was within the operational limits. On the basis of the factual information the Commission determined, that the weights and centre of gravity of the aircraft were of no influence on the aviation occurrence.

For Zenair CH 701 SP in landing configuration:

- landing speed 96 km/h with fully extended flaps and engine throttle at position for engine speed of 3200 rpm.

In Attachment 2 the size and some data for the aircraft are shown.

1.6.3. Fuel

Before the execution of the training flight on 15.10.2005 the aircraft was refueled on Shumen airfield and the fuel quantity on-board before the engine start was 88 l (64.12 kg) and it was enough for the execution of the training flight over Shumen airfield. After the aviation occurrence the commission established a presence of 80 l (59.2 kg).

The commission considers that the type, quality and quantity of the fuel as well the aircraft and engine fuel system functioning didn't create conditions and they did not influence in any way the aviation occurrence.

1.7. Meteorological information

Overcast with cloud base at 600 – 300 m, heavy rainfall and reduced visibility, wind from 270 – 290°, speed 5 – 7 m/s, temperature 20°C.

1.8. Aids to navigation

Standard aids for Zenair CH 701 SP aircraft in accordance with the requirements of Regulation No 6 of the Ministry of Transport and Communications for aircraft operation.

1.9. Communications

There was two-way communication between the pilot and the leader of redeployment group at Shumen airfield.

There was radio-telephone communication with Sofia FIC. In the journal of on-duty operation staff there was a record for the start and the end of the flight.

There is no report and no aviation occurrence was registered.

1.10. Airport

The accident occurred during landing at Shumen airfield. The sketch of the area with the landing strip is shown in Attachment 3.

Shumen airfield is situated at the Northern end of the town of Shumen. Elevation is 232 m. Magnetic deviation is 4°E/2001. The take-off and landing area is managed by regular flying control officer, who didn't take part in the flight control when the accident occurred.

The physical characteristics of the take-off and landing area are as follows:

- unpaved airfield with possibility for landing from the four main directions with the following available distances: East – West 800 m; North – South 600 m;
 - there was no marking signs for the embankment in the immediate vicinity (4 m) from the end of the runway;
 - the size of the mowed part of the unpaved runway is 800 m long and 30 m wide, and the location and the form are shown in the sketch in the attachment to the report;
 - the flying activity on the airfield is to be conducted under visual flight rules (VFR) only;
- The airfield is former property of Shumen Air Club and currently it is owned by VOINTECH Ltd.

The take-off and landing area is not licensed according the requirements of Regulation No 20 of the Minister of Transport dated 07.04.1999 on certification of the operational fitness of airports and airfields and on licensing of airport enterprises and airport handling operators

1.11. Flight data recorders

Not available on this type of aircraft.

1.12. Wreckage and impact information

During the landing on the landing strip of Shumen airfield the aircraft with a speed of 40 – 50 km/h at the final stage of landing run collided with an embankment, covered with un-mowed grass (40 – 50 cm high). As a result of the collision with the embankment the aircraft jumped and after 8 m collided with the ground at about 40° - 50° angle.

The first touch of the aircraft with the ground was by the nose wheel and gear and as a result of the impact the attachment point of the nose gear to the fore strong wall of the aircraft fuselage failed.

After destruction and bending of the nose wheel gear under the aircraft fuselage the propeller blades hit the ground, what is visible by the traces on the earth. As a result they were destroyed and because of the resistance the aircraft nosed over and stopped on its back at a distance about 10 m from the place of the collision with the embankment in heading 270°, coincidental with the aircraft movement after landing and during the landing run.

As a result of the nosing over severe damages on the aircraft construction occurred, described in Para 1.3.

1.13. Medical and pathological information

Aircraft commander wasn't injured.

1.14. Fire

No fire occurred.

1.15. Survival aspects

The Commission has ascertained that the pilot was with safety belts, which were intact and that has assured the lack of injuries.

1.16. Tests and research

For the purposes of technical investigation and determining the causes for the aviation occurrence the Commission accomplished:

- an examination of the accident site, graphical sketch and documentation of the present facts by photographic means;
- an interview with the pilot of the aircraft and written explanation from him;
- an interview with the pilot-instructor from GALABITE AO, who instructed the private pilot on the two-way radio communication and written explanation from him;
- examination of the documents concerning the preparation of the private pilot and the aircraft for the training flight;
- examination of the documents concerning the aircraft airworthiness;
- inspection of Shumen airfield, taxiway and take-off and landing strip
- logical and probabilistic analyses of the possible reasons for the air occurrence.

2. Analysis

After the above mentioned activities were done, the Commission acquainted and examined the present facts and circumstances and rejected the practically doubtful hypotheses and analyzed the execution of the training flight by the private pilot by stages in the rapidly changing and complicated weather conditions before the aviation occurrence.

On 15.10.2005 a flight for redeployment of the two aircraft of GALABITE AO along the route Shumen – Sofia was planned.

During the preflight briefing for the flight the pilots received at 11:00 weather information from Sofia, that a warm front was coming from West with a speed of 40 – 50 km/h with precipitations and in the Veliko Tarnovo area there was heavy rainfall and the pilots decided to wait for weather improvement along the route of the flight Shumen – Sofia.

According the explanation of the aircraft commander, who was at the controls at the time of the aviation occurrence, at the moment of making decision for execution of training flight during the waiting for redeployment flight, the weather conditions at Shumen airfield was as follows: overcast with cloud base at 600 m, wind from 270°, speed 3 – 5 m/s, visibility 15 – 20 km, temperature 20°C.

The pilot reported to Sofia FIC for its decision to execute a training flight and took-off at 13:20.

The weather conditions on the airfield at the moment of decision making for execution of the flight allowed the execution of the flight under visual flight rules.

The decision for execution of the flight was taken in conditions of time deficiency, because the private pilot decided to use the favorable weather for the flight before incursion of the atmospheric front.

Because of this the preflight briefing was not fully accomplished and no calculations were made about the speed of movement of the atmospheric front and the location of the front edge of incoming weather front.

The aircraft commander has a very limited flight experience, acquainted mainly in the Sofia area and didn't know the flight area and main landmarks for circling flight at Shumen airfield.

The aircraft commander, a private pilot, was not acquainted in detail the peculiarities of take-off and landing area in respect of the landing approaches and the presence of roughness on the unpaved runway.

Calculations revealed, that the incoming front with a speed of 40 – 50 km/h for the period from 11:00 to the beginning of the flight at 13:20 should move its front edge from Veliko Tarnovo area up to 120 – 140 km in direction to Shumen.

During the flight in the maneuvering area the cloud base to the West from the take-off and landing area started to descend accompanied with a heavy rainfall and sharp deterioration of the visibility, typical for incoming front.

In view of constantly worsening of weather conditions the aircraft commander after a radio consultation with the leader of deployment group took decision for immediate landing on Shumen airfield, but because of no detailed knowledge about the area and the landmarks he made an incorrect landing approach and in result of the rainfall he lost the visual contact with the ground.

His decision for going around was right, but the intensive worsening of the weather had made the landing even more difficult.

According pilot's information the landing was made with higher speed in order to go around in case of necessity.

The wet grass covering and existing roughness brought to poor braking effect and substantial increase of the braking distance.

The runway inspection and the fixed aircraft wheel traces permitted the Commission to establish exactly the place of touching down of the aircraft on the ground, what happened to be at 80 m from the end of the runway in direction of flight. The fixed traces from the following landing run permitted to establish the place of the impact of the nose wheel into the transverse embankment, overgrown with a high grass.

The measurements done by the Commission showed that the cause for the aircraft upturn at the last phase of landing run was the embankment, which is outside the working area of the take-off and landing area, but 4 m only from the mowed part of the runway.

Because of the impossibility to stop in the boundaries of the airfield, the aircraft at a speed of 40–50 km/h met with the nose wheel the transverse situated embankment 40–50 cm high,

sharply increased the angle of attack with a following vigorous lowering of the nose, hit the ground under an angle of 40-50° and nosed over at its back 10 m behind the embankment.

The Commission made a detailed inspection of the control system of the aircraft at the place of air occurrence and established that the system has preserved its integrity in transversal and longitudinal channels. As for yaw control, the Commission established, that the vertical stabilizer was torn from attachment point, but the control chains retained their integrity and convey the commands from cockpit to the vertical stabilizer.

The written explanations of the pilot also confirmed, that there was no failure in the aircraft control system and engine problems as well.

3. Conclusions

The investigation conducted and the analyzes give the grounds for the conclusion, that the air occurrence is a result from the following

Main Cause:

A wrong decision was taken for execution of a flight by the pilot as a result of a failure to analyze of weather forecast and wrong assessment of the character and the rate of time development of the actual weather conditions on the airfield. Incorrect assessment of the parameters for landing run and stopping was done in the specific complicated flight conditions.

Immediate Cause:

Aircraft collision with transversely situated embankment and elevated in relation to the main relief of Shumen airfield during the landing roll.

Contributory Factors:

1. Little experience of the aircraft commander, manifested in:
 - insufficient preflight preparation for training flight execution;
 - lack of knowledge about Shumen airfield;
 - decision for landing in complicated weather conditions, for which the pilot had not the necessary training;
 - underestimation of braking effect and aircraft braking distance on wet unpaved runway;
2. Unmarked dangerous obstacle in immediate vicinity of the runway of Shumen take-off and landing area.

During the investigation the Commission disclosed also the following irregularities:

1. Organizing and execution of flight by GALABITE AO from unlicensed by CAA take-off and landing area with insufficient control for the condition, processing and marking of the Shumen take-off and landing area.
2. Lack of organization and regulated order for execution of training flights by private pilots over the country territory;
3. Un-established procedure for the right of leasing and giving the aircraft by owners or AO to licensed pilots in order to execute training flights.

Safety recommendations:

1. CAA in one-month term to inform in written the managers of Aviation Training Centers and AO, operating light and ultra-light aircraft, about the airfields on the territory of Republic of Bulgaria licensed by CAA and to ensure support of actual information on the website of CAA.

Person responsible: Executive Director of CAA. Time: one month from the date of receiving of the report.

2. CAA in one-month term to organize and to conduct exams of the aircraft commander realized the air occurrence for knowledge of the requirements of:

- AOM of the type of aircraft;
- aeronautical meteorology;
- physical features, artificial and natural obstacles in the areas of the licensed airfields for execution of flights.

Person responsible: Executive Director of CAA. Time: one month from the date of receiving of the report.

3. The management of AO GALABITE to submit to CAA an Individual Program for training restoration and flight and navigation check of the pilot after the aviation occurrence.

Person in charge: Manager of AO GALABITE , time: one month from the date of receiving of the report.

