The original of the Final Report was issued in the Slovak language.
In case of inconsistency original version in Slovak language is applicable.

MINISTRY OF TRANSPORT, CONSTRUCTION
AND REGIONAL DEVELOPMENT
OF THE SLOVAK REPUBLIC

AVIATION AND MARITIME INVESTIGATION AUTHORITY
Námestie slobody 6, P.O.BOX 100
810 05 Bratislava 15

F I N A L R E P O R T

on investigation of

parachute accident

Reg. No. SKP2015001

The investigation of occurrence has been conducted pursuant to Art. 18 of the Act No. 143/1998 on Civil Aviation (Civil Aviation Act) and on Amendment of Certain Acts and in accordance with the Regulation (EU) No. 996/2010 of the European Parliament and of the Council on investigation and prevention of civil aviation accidents and incidents, governing the investigation of civil aviation accidents and incidents.

The final report is issued in accordance with the Regulation L 13 that is the application of the provisions of ANNEX 13 Aircraft Accident and Incident Investigation to the Convention on International Civil Aviation.

The exclusive aim of investigation is to establish causes of accident, incident and to prevent their occurrence, but not to refer to any fault or liability of persons.

This final report, its individual parts or other documents related to the investigation of occurrence in question have an informative character and can only be used as recommendation for the implementation of measures to prevent occurrence of other accidents and incidents with similar causes.

A. INTRODUCTION

Operator:	Slovenský národný aeroklub / Slovak National Aeroclub
Owner of parachute:	private person
Organiser of parachute operation:	Aeroclub Dubnica nad Váhom
Jump off point:	aerodrome Dubnica nad Váhom / LZDB
Flight phase:	jump
Place of parachute accident:	364 m NNW away of the centre of the threshold of RWY23 N 49°00´10,87´´, E 18°11´43,25´´
Date and time of accident:	15.09.2015, 10:20

Note: All time data in this report are stated in the UTC time.

B. INFORMATIVE SUMMARY

The parachutist jumped off with fastened parachute canopy bag (rope). After the smooth jump and air filling of the main parachute canopy 2 to 3 twists appeared on the rigging cords. The main parachute canopy started to slightly rotate. The rotation speed and hence the rate of fall gradually increased. The parachutist did not handle the situation in spite of being given instructions by the instructor and fell on the field, rotating at an increased rate.

The medical emergency service and the air rescue service were called immediately to the place of accident.
The parachute accident was reported through the operator (organiser of parachute operation) to the Aviation and Maritime Investigation Authority of the Ministry of Transport, Construction and Regional Development of SR.

The following commission was appointed for investigation of the accident:

Ing. Igor BENEK – chairman of the investigation commission
Miroslav GÁBOR – member of the investigation commission

The report is issued by:
Aviation and Maritime Investigation Authority
of the Ministry of Transport, Construction and Regional Development of the Slovak Republic

C. MAIN PART OF REPORT

1. FACTUAL INFORMATION

1.1 History of the flight

On 15.09.2015 at the aerodrome LZDB, the parachute operation organised by the Aeroclub Dubnica nad Váhom in accordance with the Rules for Parachute Jumping (Regulation No 4/2010) and the Guideline V-PARA-1 took place.

The jumps were conducted from aircraft type L-60S, identification No. OM-LKO, from altitude of 1,200 m above the ground level (hereinafter "AGL").

During the first air the named parachutist conducted a jump as "basic trainee" with automatic opening of the parachute after the jump from the aircraft.

The parachutist conducted a jump with fastened parachute canopy bag (rope).

After the smooth jump and air filling of the main parachute canopy 2 to 3 twists appeared on the rigging cords, which caused a slow rotation of the main parachute canopy. The rotation speed and hence the rate of fall gradually increased.

The parachutist did not handle the situation in spite of being repeatedly given instructions in safe altitude by the instructor through the radio station to throw away the main parachute and to open the booster parachute, which in this case would have opened automatically after the drop of the main parachute.

The parachutist fell on the hard agricultural field, rotating at an increased rate of 13.76 m/s.

Daytime: day

1.2 Injuries to persons

Injury	Crew	Passengers	Other persons
Fatal	1	-	-
Serious	-	-	-
Minor	-	-	-
None	-	-	

1.3 Damage to parachute

No damage to the complete parachute set was detected.

1.4 Other damage

No circumstances with potential claims for compensation of other damage toward a third party were notified to the Aviation and Maritime Investigation Authority.

1.5 Information about parachutist

A national of the Slovak Republic, aged of 59 years
Older of the parachutist licence, category “basic trainee”.

Medical certificate valid from 14.09.2015, issued by authorized health facility.

Qualifications:
category “basic trainee“

Experience:
Number of jumps not specified - about 50 jumps conducted 40 years ago.

History of parachute exercise:
Theoretical training and ground training started in the afternoon on 14.09.2015 .
Training completed by examination on 15.09.2015.

The training was conducted by a licensed parachuting instructor according to the Training Programme V-PARA-2.

1.6 Information about parachute

Type of parachute:	MARS, SOLO 270, WP 210
Package with harness: Serial number:	MARS 0709/04
Booster parachute: Serial number:	WP 210 0160/04, packed on 26.03.2015
AAD device: serial number:	MPAAD 4317
Main parachute: Serial number:	SOLO 270, packed for jump on 12.09.2015 12374

1.7 Meteorological situation

Meteorological situation at the aerodrome LZDB at the time of parachute accident was suitable for parachute jumps and did not influence the accident.

Wind direction and speed: 220°, 2-3 m/s

Type, amount and ceiling of clouds: 4/8 at altitude 1300 m AGL

QNH: 1013

1.8 Aids to navigation

N/A.

1.9 Communications

N/A.

1.10 Aerodrome information

The aerodrome LZDB is a public aerodrome with irregular operation.
It was suitable for parachute operation at the time of accident.

1.11 Flight recorders

N/A.

1.12 **Wreckage and impact information**

The place of accident is situated 364 m NNW away of the centre of the threshold of RWY23. At the time of accident the field, impact point, was hard after the corn harvest. Geographical coordinates of the field: N 49°00´10,87´´, E 18°11´43,25´´.

1.13 **Medical and pathological information**

The forensic medicine expertise was conducted – assessment of the parachutist´s death with calculation of the impact velocity, evaluation of special biochemical examinations, his health condition before the parachute accident, detailed analysis of the mechanism of injuries caused by the parachute landing. At the time of accident the parachutist was not under the influence of alcohol, common drugs or narcotics, which could have decrease his attention during the jump.

The parachutist died a violent death in direct time and causal links with injuries, which he suffered through the mechanism of deceleration after the fall from height during parachute jump and which are regarded by the forensics as fatal injuries due to their general nature. In this case the rescue of life by providing immediate and specialised medical aid can be regarded as irrelevant, due to the character and scope of suffered injuries.

The external and internal examination of the body and supplementary laboratory tests of biological materials sampled during the autopsy did not detect any acute or chronical pathological changes, which could have negatively influence the attention and conduct of the named at the time of parachute accident or cause his death. Nevertheless, it is impossible to fully exclude sudden indisposition cause by short-term stress and overloading of the organism in a critical situation involving the twisting of main parachute rigging cords, with later rotation and impact of the body to the ground.

1.14 **Fire**

N/A.

1.15 **Survival aspects**

Search and rescue using SAR devices were not required.

1.16 **Tests and research**

- Parachute equipment

Check of harness with parachute package:

On the place of the ground impact it was detected that the parachute drop release and the booster parachute release were in their casings, which proves that the parachutist did not attempt to drop the rotating main parachute canopy.

Check of main parachute canopy:

On the place of the ground impact it was detected that control reins were locked in braking position. The carrying harness facing the main parachute canopy was twisted 2 and a half times, which proved the presence of 2 to 3 twists on the parachute during the flight (Formation of twists on the training parachute during jumps with fastened parachute canopy bag is a random phenomenon, which cannot be excluded. It is caused by partial rotation of the parachutist´s body and of the opening parachute in the process of its opening. Each trainee is trained to be able to handle this situation and its removal is one of prescribed operations after the check of the main parachute canopy.). Once the rigging cords had been untwisted, the rigging cords and the main parachute canopy were checked. This check did not identify any damage or other malfunction of the rigging cords and the main parachute canopy, which could have caused the increasing rotation of the parachute.

The verification of the correct packing of the main parachute:

The symmetry of the main parachute canopy and the freedom of action of individual carrying and control cords proved that the parachute had been properly packed before the jump and that its packing could not have influenced the occurrence of the parachute accident.

- On 22.09.2015 the function of the drop system and the booster parachute was checked. In the process of pulling out the drop system release no anomalies were detected: the release could be pulled out continuously without use of great physical force. Once it had been pulled out, the three-ring system was disconnected and the main parachute canopy was released without problems. By pulling the main parachute canopy, RLS (Reserve Static Line) automatically opened the booster parachute) once the main parachute was dropped. The following check of function of the booster parachute did not detect any circumstances which could have influenced its malfunction in case of use.

On the basis of technical condition of the parachute we can state that the booster parachute would have automatically opened after the drop of the main parachute canopy.

The safety system MPAAD (Military Parachutes Automatic Activation Device) was used on the parachute. The safety device was properly installed and switched in the “STUDENT“ mode. The pyrocartridge was not activated, which proves that the rate of fall of 20m/s had not been exceeded in the last 270 m/T.

- On 23.09.2015 the inspectors downloaded data from the safety device MPAAD, which confirmed that the vertical rate of fall in the last 50 m above the ground level had been 13.76 m/s.

By overall check of the parachute documentation the commission arrived at the conclusion that the parachute had been operated and maintained in accordance with valid legislation and detected no circumstances, which could have influenced the occurrence of the parachute accident.

1.17 **Organizational and management information**

The flight – airborne operation was performed in accordance with aeronautical standards valid in the territory of the Slovak Republic.

The parachute operation was organised by the Aeroclub Dubnica nad Váhom. According to the Act No 83/1990 Coll. aeroclub is a voluntary association of citizens who perform leisure and sport activity related to powered flying, unpowered flying and parachuting.
The aeroclub is voluntarily associated in a higher organisational unit – Slovak National Aeroclub of General M.R. Štefánik with seat in Žilina.

On the critical day, the operation was launched by the jumpmaster and the flight manager signing the Jumpmaster´s Journal. The check of flight operation did not identify any circumstances which could have influenced the occurrence of the accident.

The training of the basic parachuting trainees was conducted by licensed parachuting instructors according to the Training Programme V-PARA-2. On 14.09.2015 the training started at 05:00 pm and ended at 07:30 pm. On 15.09.2015 the training continued from 07:00 am to 10:00 am and was ended by examination of the trainees.

1.18 **Additional information**

The investigation of the accident did not detect any circumstances or influence of a third party which could have caused the accident.

1.19 **Useful or effective investigation techniques**

Standard investigation methods were used.

2. ANALYSIS

2.1. **Activity of parachutist**

After the opening of the parachute during the jump, the parachutist did not solve the problem (twisted rigging cords) in the prescribed manner, i.e. by extending the loose ends of the harness over his head. Instead, he continued the descent and started to rotate, probably due to the inclination of the parachute body. Without intervention of the parachutist the parachute gradually increased the speed of rotation and hence the rate of fall.

The parachutist did not solve this problem either, in spite of the increasing speed of rotation of the parachute and multiple instructions given to him by the instructor through the radiostation.

On the basis of the videorecord made accidentally from a long distance on the ground it can be stated that the parachutist did not react in the last one third of the parachute flight and did not attempt to solve the problem. This situation could be caused among others by the centrifugal force as the resultant of the rotation speed and the parachutist weight.

3. C O N C L U S I O N S / Cause of parachute incident

Causes

- Landing of the parachutist at increased rate of fall;
- Lack of training of problem solving with a training parachute.

Contributory factors

Lack of natural experiences of the parachutist caused among others by the long break in parachute jumping.

4. SAFETY RECOMMENDATIONS

The final report from investigation of the parachute incident does not contain any recommendations.

Bratislava, 22.12.2015