



**MINISTRY OF TRANSPORT, POSTS  
AND TELECOMMUNICATIONS  
OF THE SLOVAK REPUBLIC**

Air Accident and Incident Investigation Board  
Nám. slobody 6, P.O. BOX 100, 810 05 Bratislava 15

**Reg. No: SKA2010007**

**FINAL REPORT**

on investigation of an air accident  
of paraglider type **VEGA 2L**  
registration No. **OM – P111**

Date: 12.06.2010

Place: Donovaly

## A. INTRODUCTION

The investigation of air accident [AA], serious incident [SI], 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.

The final report is issued in accordance with the Regulation L 13 that is the application of the provisions of ANNEX 13 Air accident and Incident Investigation to the Convention on International Civil Aviation and with the Council Directive 94/56/EC, establishing the fundamental principles governing the investigation of civil aviation accidents and incidents.

The exclusive aim of investigation is to establish causes of an accident or serious incident and 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 the air accident have informative character and can only be used as recommendation for the implementation of measures to prevent occurrence of other air accidents and serious incidents with similar causes.

Operator / Owner:	private person
Type of operation:	general aviation
Type of aircraft:	Manufacturer AXIS PARAGLIDING / type VEGA 2 version L
Registration No.:	OM – P111
Take-off site:	Donovaly – Nová Hoľa
Flight phase:	landing approach
Place of accident:	Donovaly
	geographic co-ordinates of the place of accident:
	starting point: Donovaly – Nová Hoľa
	48°53' 19,1'' N, 019°13' 49,9'' E
	point of impact: Donovaly
	48°52' 35.2'' N, 019°14' 09.7'' E

Date and time of detection of accident: 12.06.2010, 14:22 hrs.

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

## B. INFORMATIVE SUMMARY

In the phase of landing approach in a low altitude the canopy of a one-seat paraglider became deformed and subsequently fell to the ground from a low height.

The pilot suffered fatal injuries.

The following person was appointed as investigator of the air accident:

Ing. GREGA Milan, member of the Permanent Investigation Board

The report is issued by:

Air Accident and Incident Investigation Board  
of the Ministry of Transport, Posts and Telecommunications of the Slovak Republic

## C. MAIN PART OF REPORT

1. FACTUAL INFORMATION
2. ANALYSES
3. CONCLUSIONS
4. SAFETY RECOMMENDATIONS

### 1. FACTUAL INFORMATION

#### 1.1 History of the flight

The pilot was conducting sports flights with start in the area of Donovaly – Nová Hoľa. On the day of accident he conducted the first flight with a length of 10 min between 10:52 and 11:02 without errors and the second flight with a length of 32 min between 13:50 and 14:22. During the second flight, in the phase of landing approach in a low altitude, the paraglider canopy became deformed and the paraglider fell to the ground. The participant of the accident suffered multiple injuries incompatible with life.

Both land and air rescue services were activated. After unsuccessful resuscitation the rescue teams were called off.

The air accident was reported by LAA SR to the Air Accident and Incident Investigation Board.

Daytime: day

#### 1.2 Injuries to persons

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

#### 1.3 Damage to aircraft

The aircraft was not damaged.

Partial damage was caused to the harness in the attempt to release the pilot from the harness during the rescue operation. Damage was caused to stitching of the third right end rib of the paraglider canopy in a length of 2 cm – released stitching.

#### 1.4 Other damages

The Air Accident and Incident Investigation Board was not informed about circumstances with potential claims for compensation of other damages toward a third party.

## 1.5 Personnel information

### Pilot of paraglider:

Citizen of Slovak Republic, aged of 54.

Holder of the pilot licence (PK A) No: 4-1260, issued by the Light Aircraft Association of SR (LAA SR) on 10 August 2007.

### Qualifications:

Pilot of PK-A from 10 August 2007 with marked validity until 15 November 2011.

Medical certificate in the form of personnel record of qualified aviation personnel of LAA SR of 15 December 2009, with marked validity until 15 November 2011.

### Flying experience:

Total number of flying hours: not identified (estimate:100-150 hrs)  
Total number of flying hours for the previous 90 days: not identified  
Of which number of flying hours with the aircraft type: not identified  
On the day of accident (including the critical flight): 00 h 42 min and 2 flights

## 1.6 Aircraft information

Type: one-seat paraglider VEGA 2 L  
Serial No: 23826402LC  
Year of manufacture: 2008  
Manufacturer: AXIS PARAGLIDING, Czech Republic

Number of flying hours from year of manufacturer: not identified

Certificate of airworthiness paraglider, issued by LAA SR on 28 February 2010, with marked validity until 15 March 2012, inspection as at 15 March 2011 ( $\pm$  3 months).

### Weight of aircraft at the time of air accident:

Empty weight of aircraft	6.5 kg
Weight of crew	95.0 kg
Weight of crew equipment	17.0 kg

Total aircraft weight at the time of AA: 118.5 kg

Maximum permitted weight of aircraft for take-off according to the flight manual is **130 kg**.

Weight of aircraft at the time of air accident was within the permitted range.

## 1.7 Meteorological information

1), 2), 3)

	05:00 hrs <sup>1)</sup>	12:00 (noon) /900 m above sea level <sup>2)</sup>	15:00 hrs /900 m altitude <sup>2)</sup>
	Visibility distance 25 km	Wing gusts up to 13m/s	Wing gusts up to 13m/s
Wind (direction / speed)	130 <sup>0</sup> / do 1m/s	175 <sup>0</sup> / 6m/s	190 <sup>0</sup> / 6m/s
Cloudiness	Clear sky	5% total cloudiness	5% total cloudiness
Temperature	18.2 <sup>0</sup> C	Max. 26 <sup>0</sup> C	Max. 26 <sup>0</sup> C

1) Data for Donovaly – source: Veľká Fatra mountain rescue service, dispatching centre of Donovaly, 12.06.2010, 05:00 hrs.

2) Data according to weather forecast of SHMÚ

3) Witnesses of the accident stated that wind direction was irregularly changing (west to south) and that the wind speed was fluctuating between 0 and 6m/s.

## 1.8 Aids to navigation

Personal navigation device of the paraglider pilot, type Garmin GPS.

## 1.9 Communications

Not applicable.

## 1.10 Aerodrome information

Donovaly - Nová Hoľa is an area serving for take-off of paragliders and hang-gliders, situated in the eastern part of the Veľká Fatra mountains, 19 km north-east of the city of Banská Bystrica. The use of the area was approved by the respective owner for LAA SR. The take-off area is created by a clean glass plot without trees, sloping to the south. The condition of the area corresponds to the use for determined purpose. The peak of Nová Hoľa is situated 1,402.5 m above sea level. The landing area is marked and situated in the proximity of the cableway departure station near the road E77 connecting the cities of Banská Bystrica and Ružomberok in an altitude of 900 m.



### 1.11 Flight recorders and other recording systems

No flight recorders were used. The pilot had the possibility to obtain basic flight data using the device Garmin GPS. The device was not damaged and was operational.

### 1.12 Wreckage and impact information

The point of impact is situated 100 m south-west of the road E77 on an uneven hard surface of the new building site near a gravel yard.

### 1.13 Medical and pathological information

The pilot suffered serious injuries due to the fall. The rescue service performed resuscitation of the injured pilot on the site, with negative result. The immediate cause of death was accident shock trauma with blood loss out of the vascular bed, multiple fractures of trunk bones and extremities and rupture of the membrane of the heart.

### 1.14 Fire

Not applicable.

### 1.15 Survival aspects

The search and rescue using the SAR means were not required.

### 1.16 Tests and research

- 1) The flight records according to GPS device were examined. The findings of the analysis of the last flight phase are set out in paragraph 1.18.
- 2) The expert report on the condition of paraglider was prepared for the needs of the police.

### 1.17 Organizational and management information

Not applicable.

### 1.18 Additional information

#### A) Extract from GSP records (second flight, final phase):

- 1) 14:22:43 – altitude 948 m, ground speed 33 km/h, course 74°, coordinates of position N48°52'34.3'' E019°14'07.3'', length of section 37 m;
- 2) 14:22:47 - altitude 947 m, ground speed 31 km/hod, course 50°, coordinates of position N48°52'34.6'' E019°14'09.0'', length of section 17 m;
- 3) 14:22:49 - altitude 945 m, ground speed 25 km/hod, course 26°, coordinates of position N48°52'35.0'' E019°14'09.9'', length of section 7 m ;
- 4) 14:22:50 - altitude 941 m, ground speed 14 km/hod, course 358°, coordinates of position N48°52'35.2'' E019°14'09.8'', length of section 4 m;
- 5) 14:22:51 - altitude 935 m, ground speed 9 km/hod, course 301°, coordinates of position N48°52'35.3'' E019°14'09.8'', length of section 3 m ;
- 6) 14:22:52 - altitude 931 m, ground speed 9 km/hod, course 257°, coordinates of position N48°52'35.3'' E019°14'09.7'', length of section 3 m ;
- 7) 14:22:53 - altitude 933 m, ground speed 15 km/hod, course 161°, coordinates of position N48°52'35.3'' E019°14'09.6'', length of section 4 m;
- 8) 14:22:54 - altitude 920 m, ground speed – not recorded, course – not recorded, coordinates of position N48°52'35.2'' E019°14'09.7'' , length of section – not recorded.

## **B) Parameters of paraglider VEGA 2L**

Minimum flight speed 23 km/h, maximum flight speed 56 km/h, empty weight 6.5 kg, minimum take-off weight 100 kg, maximum take-off weight 130 kg, category EN – C.

- C)** From the statement of a witness observing the flight from road E77 it results that the participant of the accident was heading approximately to the east during a longer period before the final flight phase. Its flight was stable and without negative manifestations. In a relatively low altitude the paraglider approached the road E77 where he started a left turn. After this manoeuvre the witness noticed that the paraglider canopy had become deformed with ropes remaining in the perpendicular position.

The second witness observing the flight from the parking area near the cableway says that he saw the start of the left turn in a low altitude, approximately above the road E77. He also registered the deformation of one side of the paraglider canopy. He could not see the last phase due to building site obstacles. He confirmed that the wind for landing was variable in terms of direction and speed.

- D)** According to the expert report on the condition of paraglider prepared for needs of the policy it was stated that from the view of airworthiness, the paraglider condition had not influenced the occurrence of the air accident.

### **1.19 Useful or effective investigation techniques**

Standard investigation methods were used.

## **2. ANALYSIS**

The flight was conducted with paraglider Vega 2L, that is classified to the category EN-C, i.e. paraglider with moderate passive safety designed for pilots who regularly fly and master the flying of gliders with decreased passive safety.

After the first flight the pilot decided to make another fly that he started at 13:50 hrs. Wind with south to west direction and speed of 6 m/s was flowing in the take-off area. At that time wind gusts in the west direction with speed of 8 m/s were also recorded. The whole flight occurred without negative manifestations until the pilot started to change the flight course by a left turn from the east course to the south course in the phase of landing approach.

According to weather forecast for that day and location the meteorological conditions can be described as suitable, but limiting, especially in terms of the wind speed in gusts, because the forecast expected wind gusts with speed of up to 13 m/s.

The witnesses of the accident confirmed these gusts with speed of 8 m/s in the take-off area as well as variable wind, in terms of wind direction and intensity, in the landing area. According to the witness statement, west wind with speed of 5-6 m/s was recorded at the time of accident (judged by the position of wind direction indicator - wind sleeve on the landing ground, which was approximately in the horizontal position), but they also registered near dead-calm conditions (wind direction indicator – wind sleeve on the landing ground was approximately in the vertical position).

According to the GPS records, the participant of the accident was conducting a part of the flight with a length of 25 s (part of flight before time indicated in paragraph 1.18 of this report) with east course and (ground) speeds ranging from 28 to 53 km/h (speed of 28 km/h being short-term and unique). The average ground flight speed of this part of flight (25 s, GPS record No 919-929) was 41.9 km/h.

The final flight phase (described in paragraph 1.18 of this report) was conducted with average ground speed of 19.4 km/h. In this final phase the pilot was making a left turn from the course of 74° to the course of 161°, with ground speed of 9 km/h in the part of courses 301° and 257°. This speed increased to 15 km/h and, at the same time, the altitude of flight increased by 2 m (from 931 m to 933 m). This increase of altitude was most probably caused by more intensive paraglider banking to the left, whereby the pilot's body moved to the right and found itself higher above the horizontal plane. The increase of ground speed of 15 km/h caused that the pilot's body moved outwards from the turn.

On the basis of the witness statement it was stated that approximately the first third of the left turn in this final flight phase had been conducted without loss of altitude. Once the deformation of one part of the paraglider canopy was registered, the altitude significantly decreased. The final flight height (data set out in paragraph 1.18 of this report) occurred approximately in altitudes of 28 – 13 m above ground. The paraglider fell to the ground approximately from the altitude of 13 m.

From analysis of ground speed conditions, meteorological conditions and witness statements it can be concluded that in the critical phase the paraglider was flying with the following flight speeds:

- in the most favourable conditions (headwind 21.6 km/h, ground speed 9 km/h) **30,6 km/h** is a flight speed where the fall of paraglide to the ground is the least probable;
- in the most unfavourable conditions (headwind 0 km/h, ground speed 9 km/h) **9 km/h** is insufficient speed for flight of this paraglide type, in view of its minimum determined flight speed of 23 km/h. Moreover, this flight phase was conducted in a turn, where speed required for maintenance of flight should be much higher than the minimum flight speed for paraglider, i.e. 23 km/h.

The total number of flight hours of the participant of the accident and the paraglider could not be identified. It was indicated neither in the personnel records of the aviation personnel of LAA SR, nor in the request for issue of the certificate of airworthiness. According to the witness statement the participant of the accident was not flying intensively, but his total number of flight hours was estimated to 100 to 150 hours.

The pilot licence /PK A/ and the certificate of airworthiness were valid at the time of accident.

From the view of airworthiness the paraglider had no influence on occurrence of the air accident.

### **3. CONCLUSIONS / Cause of air accident**

**Main cause of accident:**

loss of flight speed in a turn.

**Contributing factors:**

- low flying altitude at the start of the turning manoeuvre
- meteorological situation with limit wind speed values.

### **4. SAFETY RECOMMENDATIONS**

Following the investigation of causes of the air accident of paraglider:

type: **VEGA 2L**

registration: **OM – P111**

serial No: **23826402LC**

date of accident: **12.06.2010**

We recommend the implementation of the following measures:

- 1. Publication of investigation results on the website of LAA SR.**
- 2. Analysis of the air accident at level of the Parachute Flying Unit of LAA SR (managed by the unit chief inspector) with special focus on the paraglider flight in a turn and on flight tests of paragliders type VEGA 2L according to EN-962 of 8 May 2007 and 10 May 2007. The analysis should be performed with instructors and inspectors of the union as a part of regular annual training 2010 – 2011. To publish the text of analysis on the website of the Parachute Flying Unit of LAA SR.**
- 3. Harmonisation of qualifications of the pilot PK A-C determined in the pilot licence and the category of safety EN A-D determined in the certificate of airworthiness of LAA SR. The harmonisation is responsibility of the pilot.**
- 4. Not to issue the pilot licence and the certificate of airworthiness without indication of the number of flight hours in the personnel records and in the request for the certificate of airworthiness. Responsible: specialised bodies of LAA SR.**

Bratislava, 31 July 2010