

MINISTRY FOR
INNOVATION AND TECHNOLOGY
TRANSPORTATION SAFETY BUREAU

FINAL REPORT

2017-186-4

Accident

Farkashegy Airport (LHFH)

20 May 2017

Schleicher K-7

HA-5052

The sole objective of the safety investigation is to reveal the causes and circumstances of aviation accidents or incidents and to initiate the necessary technical measures and make recommendations in order to prevent similar cases in the future. It is not the purpose of this activity to investigate or apportion blame or liability.

NOTE: This document is the translation of the Hungarian version of the final report. Although efforts have been made to translate it as accurately as possible, discrepancies may occur. In this case, the Hungarian is the authentic, official version.

General information

This investigation has been carried out by Transportation Safety Bureau on the basis 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,
- Act XCVII of 1995 on aviation,
- Annex 13 identified in the Appendix of Act XLVI. of 2007 on the declaration of the annexes to the Convention on International Civil Aviation signed in Chicago on 7th December 1944,
- Act CLXXXIV of 2005 on the technical investigation of aviation, railway and marine accidents and incidents (hereinafter referred to as: Kbvt.),
- NFM Regulation 70/2015 (XII.1) on technical investigation of aviation accidents and incidents, as well as on detailed investigation for operators, or,
- In absence of other related regulation of the Kbvt., in accordance with Act CXL of 2004.

The competence of the Transportation Safety Bureau of Hungary is based on Government Decree № 278/2006 (XII. 23.), and, as from 01 September 2016, on Government Decree № 230/2016. (VII.29.) 23) on assignment of a transportation safety body and on the dissolution of Transportation Safety Bureau with legal succession.

Pursuant to the aforesaid laws

- The Transportation Safety Bureau of Hungary shall investigate aviation accidents and serious aviation incidents.
- The Transportation Safety Bureau of Hungary may investigate aviation accidents and incidents which – in its judgement – could have led to more accidents with more serious consequences in other circumstances.
- The Transportation Safety Bureau of Hungary is independent of any person or entity which may have interests conflicting with the tasks of the investigating body.
- In addition to the aforementioned laws, the ICAO Doc 9756 and the ICAO DOC 6920 Manual of Aircraft Accident Investigation are also applicable.
- This Report shall not be binding, nor shall an appeal be lodged against it.
- The original version of this Report was written in the Hungarian language.

Incompatibility did not stand against the members of the IC. The persons participating in the technical investigation did not act as experts in other procedures concerning the same case and shall not do so in the future.

The IC shall safekeep the data having come to their knowledge in the course of the technical investigation. Furthermore, the IC shall not be obliged to make the data – regarding which the owner of the data could have refused its disclosure pursuant to the relevant act – available for other authorities.

This Final Report

was based on the draft report prepared by the IC and sent to all affected parties (as specified by the relevant regulation) for comments.

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Definitions and abbreviations

AT	<i>Air Tow Rating</i>
BFU	<i>Bundesstelle für Flugunfalluntersuchung (German Federal Bureau of Aircraft Accident Investigation)</i>
Cloud Flying	<i>Sailplane Cloud Flying Rating</i>
FI(S)	<i>Flight Instructor (Sailplane)</i>
HAA	<i>Hungarian Aeronautical Association</i>
IC	<i>Investigating Committee</i>
ICAO	<i>International Civil Aviation Organization</i>
Kbvt.	<i>Act CLXXXIV of 2005 on the technical investigation of aviation, railway and marine accidents and incidents</i>
LT	<i>Local Time</i>
MNDNFM	<i>Ministry of National Development</i>
SGPL	<i>Student Glider Pilot Licence</i>
SL	<i>Self-Launch Rating</i>
TSB	<i>Transportation Safety Bureau (Hungary)</i>
UTC	<i>Coordinated Universal Time</i>
WL	<i>Winch Launch Rating</i>

Introduction

Occurrence category		Accident
Aircraft	Manufacturer	Alexander Schleicher GmbH & Co. Segelflugzeugbau, Germany
	Type	Schleicher K-7
	Registration sign	HA-5052
	Operator	Hungarian Aeronautical Association
Occurrence	Date and time	20 May 2017, 18:45 LT
	Location	Farkashegy Airport (LHFH)
Number of deceased / severely injured people in the accident:		0 / 1
Extent of damage of the aircraft involved in the occurrence:		significantly damaged

Any clock-time indicated in this report is given in local time (LT). Time of the occurrence: LT= UTC+ 2 hours.

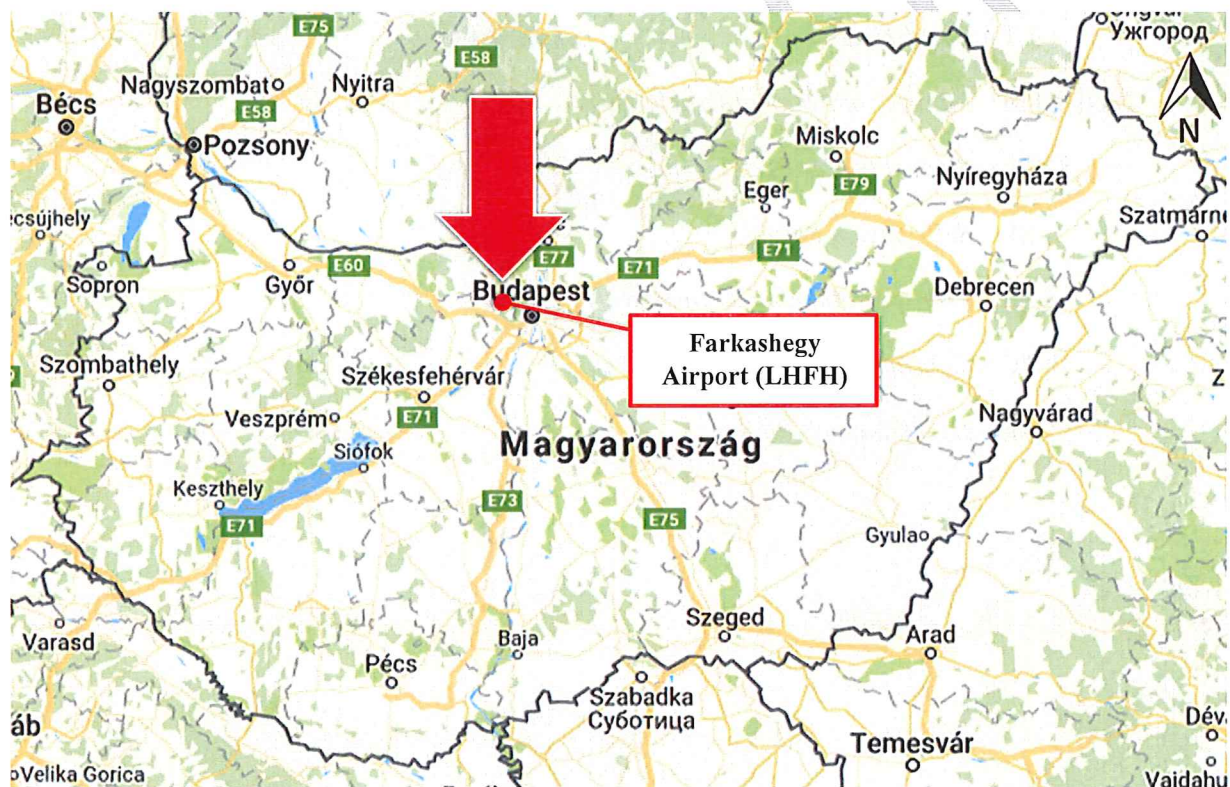


Figure 1: Location of the occurrence in Hungary

Reports and notifications

The occurrence was reported to the dispatcher of TSB by the duty service of Flight Safety Organisation, HAA, on 20 May 2017, at 19: 27.

TSB Hungary notified the BFU as the investigation body of the state of the designer and manufacturer of the aircraft on 25 May 2017.

Investigating Committee

The Head of TSB assigned the following investigating committee (hereinafter referred to as IC) to the investigation of the case:

Investigator-in-charge
Member

Miklós Ferenci
Gábor Erdősi

Investigator
Investigator

Overview of the investigation process

A committee investigated the scene of the occurrence from 20:09 to 22:00 on 20 May 2017.

During the investigation, the IC:

- interviewed the pilot in command;
- interviewed witnesses;
- assigned a meteorologist to evaluate meteorological data.

Short summary of the occurrence

After take-off at Farkashegy Airport, the Flight Instructor and a person with Student Pilot Licence (hereinafter: the “Student Pilot”) performed training flight in strong wind and turbulence. At the end of the flight, the Flight Instructor performed landing due to the wind conditions; the aircraft descending at high rate touched down onto the main landing gear. The Student Pilot was injured and the aircraft was damaged in the occurrence. The aviation safety organisation, which is a partner to a contract with the owner of the aircraft, issued a measure in which they call the attention of all operator and training partner organisations to the specific characteristics of flying in the circumstances of intensive turbulence.

The IC attributes the cause of the occurrence to incorrect assessment of the situation by the Flight Instructor.

The IC proposes no safety recommendation relating to the occurrence.

1. Factual information

1.1. History of the flight

On 20 May 2017, the Flight Instructor and his Student Pilot took off for a training task in a type K-7 sailplane. It is known from witness statements that the Flight Instructor flew with the Student Pilot because of the strong wind and turbulence. After about an hour of flight, the Flight Instructor and the Student Pilot approached the fourth turning point to Runway 33 of Farkashegy Airport in order to land. On completion of the fourth turn, the flight altitude of the aircraft was a little higher than usual, about 250 metres relative to the location of the take-off. The two people who had been on board at the time of the occurrence stated unanimously that the aircraft had been flown by the Flight Instructor. During the final approach, the Flight Instructor applied full spoilers, flying at 90 km/h indicated airspeed, so that he can stop the aircraft as close to the start point as possible. Due to a combination of strong wind, approach speed and fully extended spoilers, they approached the runway at a steeper angle than the usual landing approach profile. When starting the landing manoeuvre, at an altitude of 15 to 20 metres above ground level, Flight Instructor found the speed of the aircraft slow in the given circumstances, so he attempted to increase speed by retracting the spoilers and simultaneously starting a speed-gaining manoeuvre (pitch down). During the manoeuvre, the Flight Instructor realised that the airspeed of the aircraft did not grow while descent was invariably intensive. In that new situation, at an altitude of about 3 metres, the Flight Instructor tried to reduce the intensity of descent by pulling the control stick backwards. Subsequently, the main landing gear of the aircraft crashed to the ground at high vertical speed. The Student Pilot occupying the front seat suffered a vertebral fracture and the fuselage of the aircraft was damaged significantly due to the impact.



Figure 2: The aircraft involved in the occurrence, after landing

1.2. Injuries to persons

Injuries	Crew		Passengers	Other
	Pilot	Flight Attendant		
Fatal	-	-	-	-
Serious	1	-	-	-
Light	-	-	-	
Uninjured	1	-	-	

1.3. Damage to aircraft

According to information from the flight safety organisation contracted with the owner of the aircraft, the damage to the aircraft has been assessed (by X-ray and endoscopy methods) since the occurrence. The wings were not damaged: the connections, as well as the wooden structure remained intact. The lower stringer of the fuselage web bent between two joints, which led to arc-shaped bending of 3 upper stringers (Figure 3).

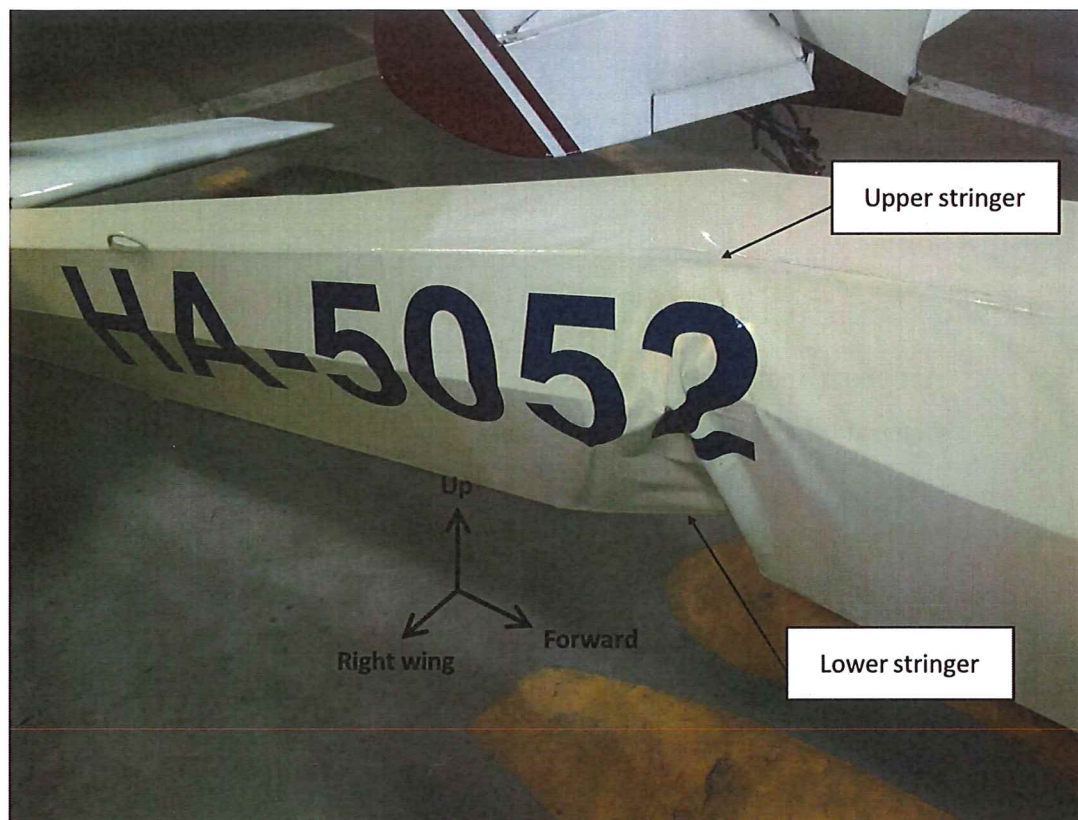


Figure 3: Damaged fuselage of the aircraft

1.4. Other damage

The IC had got no information on other damage by the completion of the investigation.

1.5. Personnel information

1.5.1. Data of the pilot in command

Age, nationality, gender		46 years old, Hungarian male
Licence data	type	FI(S)
	professional valid until	31/10/2017
	ratings	AT, WL, SL, Cloud Flying
Certificates		Sailplane Flight Instructor
Medical class and valid until		29/04/2019
Flying hours/take-offs	in the previous 24 hours	4 hours / no data
	in the previous 7 days	4 hours / no data
	in the previous 90 days	23 hours / no data
	total:	915 hours / about 2009 pcs
	on the affected type, total:	75 hours / about 500 pcs

1.5.2. Data of the Student pilot

Age, nationality, gender		66 years old, Hungarian male
Licence data	type	SGPL
	professional valid until	30/04/2018
	ratings	None
Certificates		Student Pilot
Medical class and valid until		22/03/2018
Flying hours/take-offs	in the previous 24 hours	1 hour 56 min. / 4 pcs
	in the previous 7 days	4 hours 26 min. / 5 pcs
	in the previous 90 days	11 hours 28 min. / 30 pcs
	total:	44 hours 13 min. / 251 pcs
	on the affected type, total:	44 hours 13 min. / 251 pcs

1.6. Aircraft information**1.6.1. General information**

Class	Fixed-wing sailplane without engine
Manufacturer	Alexander Schleicher GmbH & Co. Segelflugzeugbau, Germany
Model	Schleicher K-7
Year of manufacture	1958
Serial number	464
Nationality and registration marks	HA-5052
State of registry	Hungary
Name of the owner	MÁV Sportrepülő Egyesület

	Flying hours	Number of take-offs
Since manufacture	4960:17	21875
Since last periodical maintenance	79:25	427

1.6.2. Notes relating to airworthiness of the aircraft

Airworthiness Certificate	Number	7005
	Valid until	Until withdrawal
	Restrictions	None

Airworthiness Review Certificate	Date of issue	05/08/2016
	Valid until	05/08/2017
	Date of latest review	05/08/2016

1.6.3. Aircraft loading data

Aircraft data did not influence the course of events, so it needs no detailed discussion.

1.6.4. Description and data of malfunctioned system or equipment

No information emerged during the investigation on malfunction of the structure or any system of the aircraft prior to the occurrence thus contributing to the occurrence or influencing the course of events.

1.7. Meteorological information

The occurrence took place at daytime, in good visibility conditions. In the afternoon of the day of the occurrence, the NW wind freshened in the area after a noticeable intrusion of cold air in the lower atmosphere, and it became stormy (15 to 20 m/s) by the time of the occurrence, according to data recorded by the meteorological station at Jánoshegy. The wind blew the mountain ridge almost perpendicularly, from directions ranging from 280° to 305°. The angles of the slopes near Farkashegy Airport are 20° to 30°.

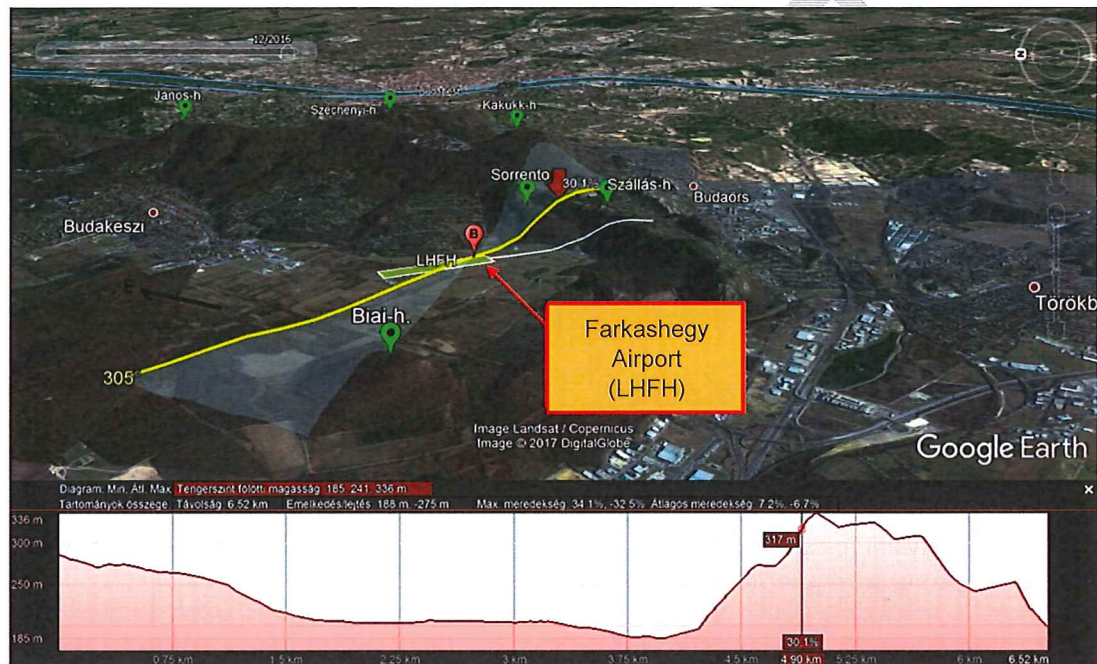


Figure 4: Vertical section view of the terrain as seen from Farkashegy Airport; direction of view: 305°

According to data recorded at the start place, the wind blew from directions varying from 310° to 320° at speeds between 6 to 10 m/s all day. In comparison with the stormy upper wind, only wind speeds of 10 to 12 m/s were measured even at Budaörs Airport which is located in a natural wind tunnel and the average wind speeds were about 10 m/s in the non-leeward part of the Pest Plains.

1.8. Aids to navigation

The navigation equipment did not influence the course of events, so it needs no detailed discussion.

1.9. Communications

The communication equipment did not influence the course of events, so it needs no detailed discussion.

1.10. Aerodrome information

The aerodrome involved in the occurrence had valid operation certificate.

Name of aerodrome	Farkashegy Airport
ICAO Code of aerodrome	LHFH
Airport operator	MÁV Repülő Sportegyesület
Elevation	215 m
Runway direction	33 / 15
Runway dimensions	1000m x 200m
Runway surface	Grass

The parameters of the aerodromes did not influence the course of events, so they need no detailed discussion.

1.11. Flight recorders

No data recorder was installed in the aircraft; it is not required for the aircraft type affected.

1.12. Wreckage and impact information

The aircraft came to rest at the location with the geographic coordinates N47°28'59.74" E018°55'06.31". See Section 1.3 for damages to the aircraft.

1.13. Medical information

According to the result of the breathalyser test taken by the police, the Flight Instructor had not been under influence of alcohol. There was no forensic medical examination. The Student Pilot suffered vertebral injury during the occurrence. There was no evidence that physiological factors or other impediments had affected the legal capacity of the personnel concerned prior to the occurrence.

1.14. Fire

There was no fire in connection with the occurrence.

1.15. Survival aspects

No life threatening situation developed in connection with the occurrence. It is known from witness statements that, after the aircraft crashed to the ground, the Flight Instructor and the Student Pilot got out of the aircraft on their own, with no help.

1.16. Tests and research

The IC performed or ordered no tests or examinations.

1.17. Organizational and management information

The features of the organizations involved did not affect the occurrence, so their detailing is not required.

1.18. Additional information

The sailplane model K-7 flew on 27 September 1956, and was manufactured by the German company Alexander Schleicher until the end of 1966. This model was designed for the purpose of training, and it is characterised by high level of stability, and it is easy to control. An additional advantage is that its spoilers are extremely effective. Accordingly, it can glide at a fairly steep path. Due to its effective spoilers, during landing, the spoilers must be

retracted significantly (about half-way) when the pilot reduces the glide slope angle. If it is not performed during flare close to ground level then the aircraft will maintain its high rate of descent. The pilot must take the mass of the aircraft into account when selecting the speed for the final approach and the altitude to reduce the glide angle. The speed of the aircraft needs to be faster in the case of a heavier aircraft, and it also should be taken into account that, in the case of a heavier aircraft, inertia of the aircraft will be greater during retracting of the spoilers.

The IC received no substantial additional data, and the does not find it necessary to publish information in addition to the above facts.

1.19. Useful or effective investigation techniques

The investigation did not require techniques differing from the conventional approach.

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2. Analysis

2.1. Weather conditions

On the basis of meteorological data indicated in Section 1.7, the IC supposes that the wind speed decreased dramatically with the decrease of altitude. The speed of the aircraft relative to the air may decrease significantly in such cases.

2.2. The Flight Instructor's activity

In the opinion of the IC, it is definitely important to maintain the flight crew's situation awareness during the operation of aircraft. Situation awareness highly depends on the availability of the pilot's attention, the level of stress associated to the situation, and the mental load imposed by the activity being performed. Partial or full loss of the capacity of situational awareness may lead to decision problems which in turn may result in errors. The position of the IC is that the Flight Instructor's striving to land close to the start place, the approach angle steeper than usual, the lower-than-expected speed of the aircraft and the turbulent weather imposed great load on the Flight Instructor. As a result of increased mental load, the Flight Instructor did not pay sufficient attention to other environmental parameters (e.g. wind gradient) associated to flight. The position of the IC is that when the Flight Instructor realised that the speed of the aircraft was slower than expected and the rate of descent exceeded the usual value, he intervened. However, that intervention took place at an altitude where retraction of the spoilers and the speed-gaining manoeuvre was insufficient due to the wind gradient.

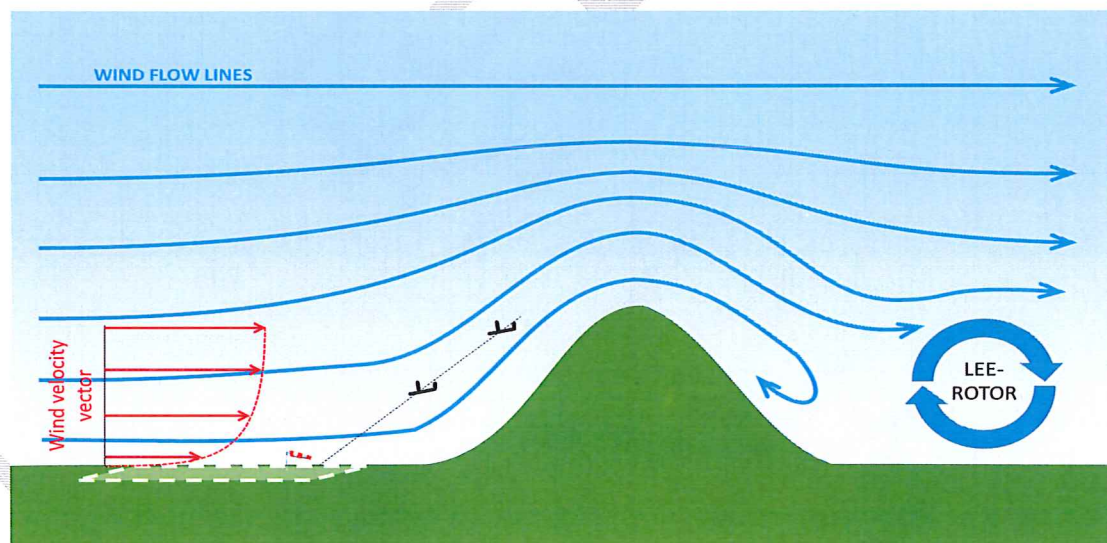


Figure 5: Vertical gradient of the wind at the windward side of the mountain and the airflow behind the mountain¹

¹ Meteorológiai alapismeretek, Eötvös Loránd Tudományegyetem Meteorológiai Tanszék [Fundamentals of Meteorology. Dept. of Meteorology, Eötvös Loránd University]; 2013

3. Conclusions

3.1. Findings

Members of the flight crew had the appropriate licences and ratings and great experience for the given flight task.

The aircraft was airworthy. The aircraft had a valid airworthiness certificate. According to its documents, it was equipped and maintained in compliance with the requirement in effect and with the accepted procedures.

No information emerged during the investigation on malfunction of the structure or any system of the aircraft prior to the occurrence, thus contributing to the occurrence or influencing the course of events.

The aircraft was damaged during the occurrence.

The flight took place in good visibility conditions, at daytime.

The flight took place in strong wind and turbulence.

The Flight Instructor incorrectly assessed the flow conditions in the environment of their landing.

During the final section of landing, the Flight Instructor flew at a speed which was lower than necessary, and decreased the glide angle at insufficient altitude.

No such information emerged relating to parameters of the aerodromes which could be related to the occurrence.

3.2. Causes

The IC concluded during the investigation that the cause of the occurrence was that the Flight Instructor did not take into account adequately the vertical gradient of the wind speed and the turbulence associated to the given wind conditions.

The Flight Instructor's striving to stop as close as possible to the start point after landing contributed to the occurrence.

4. Safety recommendations


4.1. Actions taken by the flight safety organisation, which is a partner to a contract with the owner of the aircraft, during the safety investigation

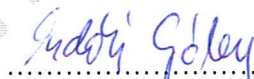
Flight Safety Organisation, Hungarian Aeronautical Association proposes in connection with the occurrence, as a safety recommendation, that, in order to avoid similar cases, the operating and training organisation should remind the crews of the aircraft of specific features of flying in conditions of intensive turbulence before flights to be performed in similar weather conditions; with special attention to the aerodynamic aspects of turbulence and to the appropriate procedure of eliminating its adverse effects.

4.2. Safety recommendation issued on completion of the investigation

The Investigating Committee of TSB identified no circumstance which would warrant issuance of a safety recommendation.

Budapest, 16. July 2019


.....
Miklós Ferenci
Investigator-in-charge


.....
Gábor Erdősi
Member