



MINISTRY OF  
NATIONAL DEVELOPMENT  
TRANSPORTATION SAFETY  
BUREAU OF HUNGARY

# **FINAL REPORT**

**2014-243-4P**  
**Serious incident**

**Outskirts of Forró village**  
**19 June 2014**

**Cessna 150F**  
**OK-DAN**

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

## INTRODUCTION

### **This investigation was carried out by Transportation Safety Bureau, Hungary 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 of the Convention on International Civil Aviation signed in Chicago on 7<sup>th</sup> December 1944,
- Act CLXXXIV of 2005 on the technical investigation of aviation, railway and marine accidents and incidents (hereinafter referred to as Kbvt.),
- Decree № 123/2005. (XII. 29.) of the Ministry of Economy and Transport on the rules of technical investigation of aviation accidents and incidents and other occurrences,
- Decree № 70/2015 (XII.1) of the Ministry of National Development on the technical investigation of aviation accidents and incidents, as well as on the detailed investigation for operators, and,
- In absence of other relevant regulation in the Kbvt., in accordance with Act CXL of 2004 on the general rules of administrative authority procedure and service.

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 organisation and on the dissolution of Transportation Safety Bureau with legal succession.

### **Under the aforementioned regulations**

- The Transportation Safety Bureau of Hungary shall investigate aviation accidents and serious aviation incidents.
- The Transportation Safety Bureau of Hungary may investigate aviation incidents and irregularities which - in its judgement - would have resulted in accidents 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 organisation.
- In addition to the aforementioned laws, the ICAO Doc 9756 and the ICAO DOC 6920 Manual of Aircraft Accident Investigation are also applicable.
- This Final Report shall not be binding, nor shall an appeal be lodged against it.

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 safe keep 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.

## DEFINITIONS AND ABBREVIATIONS

CPL(A)	Commercial Pilot Licence (Aeroplane)
CRS	Certificate of Release to Service
EASA	European Aviation Safety Agency
FI(A)	Flight Instructor (Aeroplane)
GKM	Ministry of Economy and Transport / Gazdasági és Közlekedési Minisztérium
IC	Investigating Committee
ICAO	International Civil Aviation Organization
Kbvt.	Act CLXXXIV of 2005 on the technical investigation of aviation, railway and marine accidents and incidents and other transportation occurrences
LZBD	ICAO code of Bidovce Airport (Slovakia)
NFM	Ministry of National Development / Nemzeti Fejlesztési Minisztérium
NTA AA	National Transportation Authority Aviation Authority (Hungary) / Nemzeti Közlekedési Hatóság Légügyi Hivatal
NTSB	National Transportation Safety Board (USA)
PPL(A)	Private Pilot Licence (Aeroplane)
route segment	usually a flight route or a part of a flight route flown without intermediate landing
SEP(land)	Single Engine Piston Aeroplane (land)
TBO	Time Between Overhaul
TMG	Touring Motor Glider
TSB	Transportation Safety Bureau of Hungary
VFR	Visual Flight Rules

## BRIEF DESCRIPTION OF THE OCCURRENCE

<b>Occurrence category</b>		serious incident
<b>Aircraft</b>	<b>Class</b>	fixed wing aircraft
	<b>Manufacturer</b>	Cessna Aircraft Company, USA
	<b>Type</b>	Cessna 150F
	<b>Registration</b>	OK-DAN
	<b>Owner</b>	Letov Air Group s.r.o.
<b>Occurrence</b>	<b>Operator</b>	Letecka Skola
	<b>Date and time (Local Time)</b>	19 June 2014, 12:25
	<b>Location</b>	Outskirts of Forró village

### Reports and Notifications

The occurrence was reported to the dispatcher of TSB at 12:38 on 19 June 2014 by HungaroControl Zrt.

### **TSB**

- notified the duty service of NTA AA at 12:43 on 19 June 2014.
- notified the investigating organisation of the operator's country (Ministry of Transport, Construction and Regional Development of the Slovak Republic) on 24 June 2014.
- notified the investigating organisation of the country of registration (Air Accident Investigation Institute, Czech Republic) on 24 June 2014.
- notified the investigating organisation of the manufacturer's country (National Transportation Safety Board, USA) on 24 June 2014.
- notified European Aviation Safety Agency (Germany) on 24 June 2014.

### Investigating Committee

The Head of TSB assigned the following Investigating Committee (hereinafter: IC) for the investigation of the occurrence:

Investigator-in-Charge	Ferenc Kamasz	accident investigator
Member	László Szentesi	field technician

László Szentesi field technician left TSB Hungary during the investigation, therefore Gábor Torvaj accident investigator was appointed as member of the IC.

### Overview of the investigation

- After receiving the notification of the incident, the IC performed on-site investigation, during which photos were taken of the aircraft, as well as of the documents of the pilots and the aircraft. The IC interviewed the pilots and talked to the operator's representative who arrived at the scene.
- The IC did not seize the aircraft because further investigation required only the disassembly of the engine; however, the operator's representative promised the IC that the engine will be transported to the engine maintenance organisation, and that the engine maintenance organisation's report will then be sent to TSB by the operator.
- The IC attempted to contact the manager of the operator via e-mail on 24 June 2014, but received no answer.

- On 07 October 2014, the IC sent an email to the general address of the operator, in which we requested contact details of a person involved in aviation safety (safety manager) of Letecká Skola.
- On 10 October 2014, the first contact person (who is not the safety manager) answered the email message, then informed the IC on 13 October 2014 that the engine had been sent for inspection to Termikas Company, Latvia. The engine was approaching the date of the next overhaul, and such overhaul would now be performed. The above-mentioned contact person promised that he would send the IC the engine inspection report after completion.
- On 10 November 2014, the second contact person of Letecká Skola contacted the IC and informed us that the engine was currently with Termikas Company, in Latvia, for inspection. Then he promised that he would forward the engine shop report to the IC as soon as the engine is returned with the report. Later on, he informed TSB that the inspection was expected to finish in late November, and the report was due soon after.
- The IC also tried to obtain information from the above-mentioned second contact person on the malfunctioned parts of the engine on 13 February 2015 and on 19 June 2015, but no new details were received.
- On 09 February 2016, the IC contacted the investigation organisation of the operator's country (Ministry of Transport, Construction and Regional Development of Slovak Republic), in order to request help with collection of the aircraft data, engine data and engine malfunction information necessary for the investigation.
- On 17 February 2016, the Slovakian investigation organisation contacted the operator of the aircraft who appointed a third contact person for the investigation in question; that contact person gave us the information that currently the aircraft was with a Polish maintenance company, and promised us to send us all the details needed for the investigation.
- On 18 February 2016, the Slovakian investigation organisation contacted the Slovakian civil aviation authority (CAA SK) which supervises the operator of the aircraft relating to the investigation in question.
- On 29 April 2016, the IC received (from the Slovakian investigation organisation) the aircraft Flight hours data and the engine Flight hours data as of 19 June 2014, which is given in detail in Chapter 16 of this Final Report. Termikas Company Ltd. overhauled the engine after the malfunction, the IC received the overhaul statement of 27 October 2014. According to information given by the operator, the Airframe Log Book of the aircraft is not available anymore because the aircraft has been cancelled from the Czech register, and the Aircraft Log Books are with the owner, and consequently, the operator cannot send more data.
- In order to explore the cause of the engine problem, the IC tried to obtain more information on malfunctioned parts of the engine. According to information of 03 May 2016 from the Slovakian investigation organisation a broken piston ring had been found in the malfunctioned engine.
- On 04 May 2016, the IC tried to contact Termikas Company Ltd. which performed the overhaul of the engine, but no answer came to the email.
- Relying on data available, the IC performed an analysis of the incident, evaluated the pilots' activities, and, on the basis of data collected on-site and information obtained during the investigation, the IC tried to explore the cause of the technical malfunction.

- TSB Hungary sent the Draft Report on the investigation to the Slovakian and Czechish investigation organisations, as well as to the Hungarian civil aviation authority, on 20 September 2017.
- The Czechish investigation organisation answered they had no comment to the Draft Report.
- According to information from the Slovakian investigation organisation Letecká Skola Bidovce does not exist anymore.
- On 21 September 2017, the IC visited the website of Letecká Skola (which website is indicated on the side of the aircraft as well) and found a valid Approved Training Organisation Certificate issued to the name of the organisation called FUTURE FLY s.r.o. (certificate number: SK.ATO.11; date of issue: 20 April 2017).

### **Overview of the occurrence**

The aircraft took off for a navigation practice flight with two pilots onboard from Bidovce Airport, Slovakia, at 08:35, 19 June 2014. The flight took place in the daytime, in good visibility conditions. The planned route was Bidovce-Miskolc-Budapest-Kecskemét-Bidovce, without intermediate landing.

The flight was uneventful until the last route segment where, after Ináncs village, the crew perceived significant engine vibration. The crew reduced engine rpm almost to idle by changing throttle position, in order to minimise vibration. The passenger, who had flight instructor certificate, took over control of the aircraft, and when he saw that the motor performance would not be sufficient for continuing flight on the route, he decided to land on the terrain, namely a green-colour agricultural land situated on the right of Main Road 3 under the aircraft. During landing, the crew tried to flare the aircraft so that it should move at the lowest possible speed when reaching the vegetation of the height of about half a metre. After landing, the aircraft stopped following a roll of 108 metres, at 12:25.

No one was injured in the incident. There was no significant damage to the aircraft as a result of landing. Treading damage was caused to the vegetation of the agricultural land used for landing.

During the investigation, the IC found that the crew had the licenses and rating required for the flight, and that the aircraft had been found airworthy before flight, and it had valid certificates.

The IC reviewed the crew's activity in the first segment of the flight, in the period preceding the engine malfunction, and during the management of the emergency situation following the malfunction. The IC found that the crew flew the aircraft in the expected way, and, after the onset of the malfunction, they chose a suitable area for landing, with regard to the possibilities available.

During the investigation, the IC found the maintenance of the aircraft satisfactory on the basis of the documents available.

During the on-site investigation, the IC rotated the engine crankshaft, using the propeller. During that rotation, significant compression difference was found in the different cylinders. After disassembly of the engine, the IC did not manage to obtain detailed information relating to visible damages to the parts; according to the owner's statement, a piston ring in the engine was broken.

During the investigation, the IC identified no circumstance which would require the issuing of a safety recommendation.

## 1. FACTUAL INFORMATION

### 1.1 History of the flight

The aircraft took off from Bidovce Airport (LZBD) at 08:35 on 19 June 2014, with a pilot with PPL(A) license and another pilot with CPL(A) flight instructor certificate on board, for a practice flight. The planned goal of the VFR flight was to practice navigation tasks to be performed in a foreign area, on a Bidovce-Miskolc-Budapest-Kecskemét-Bidovce route, without intermediate landing.

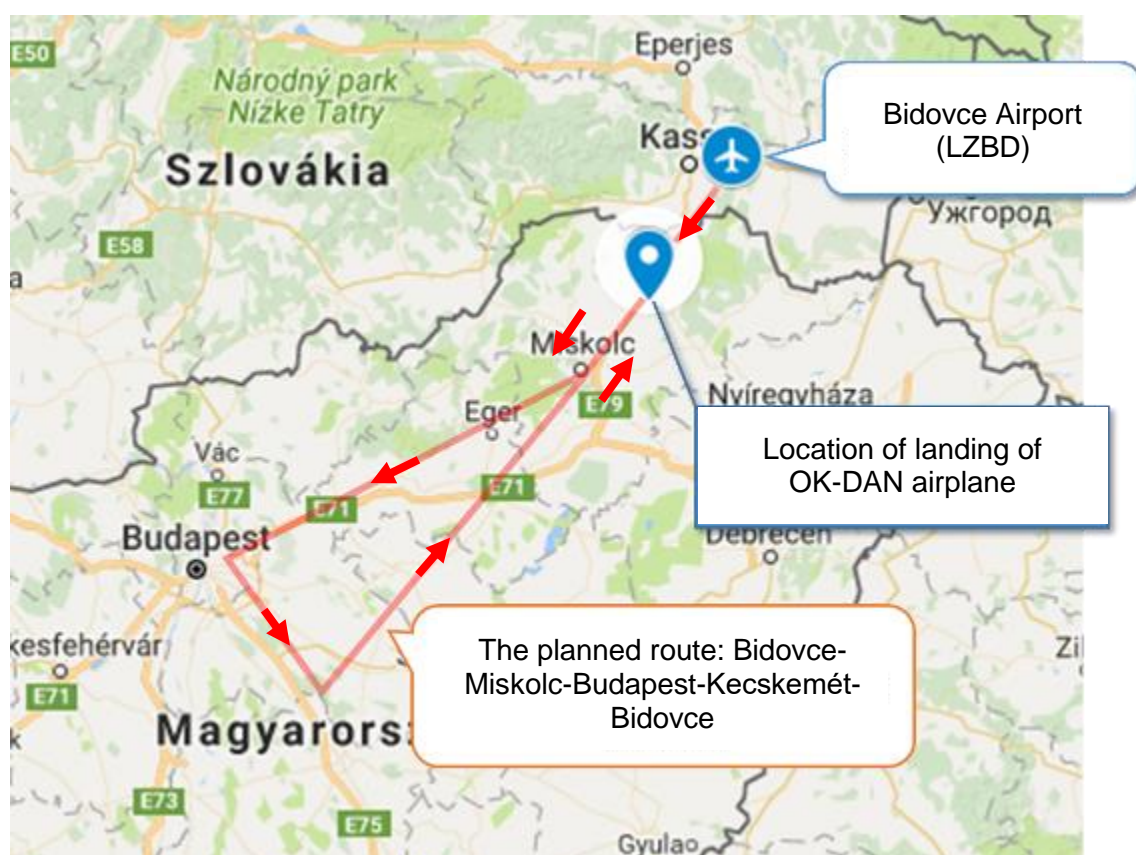


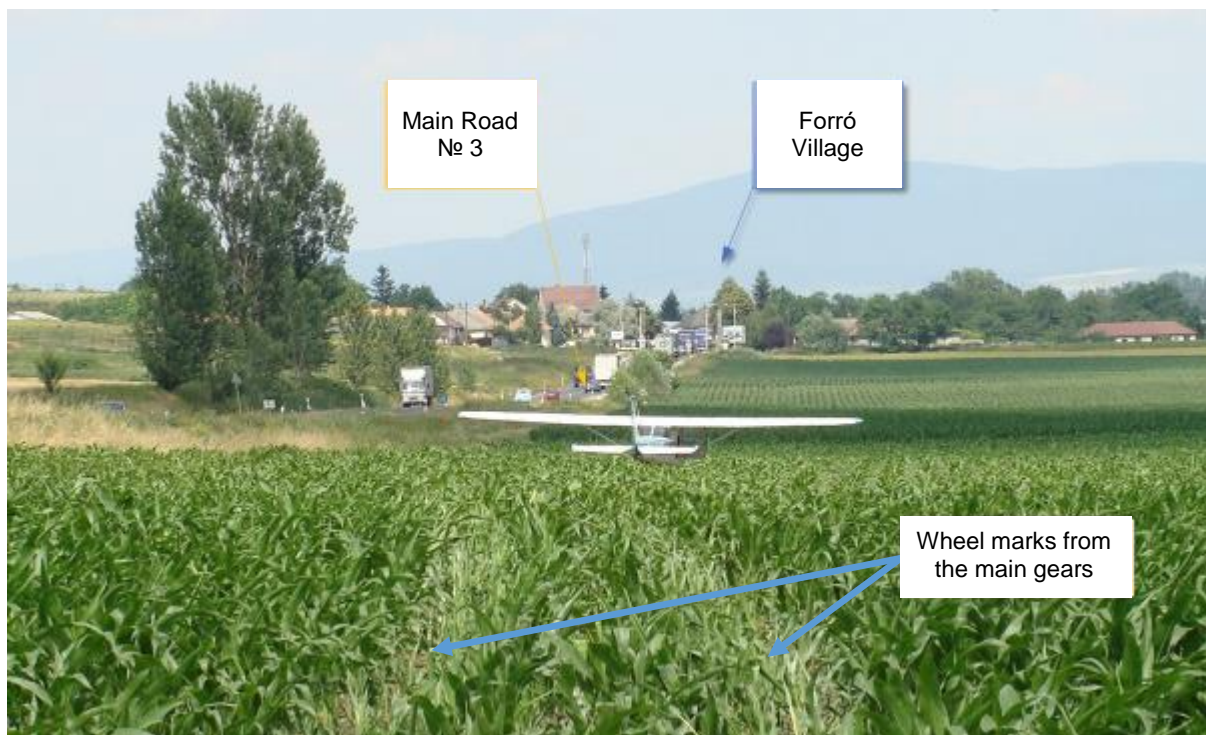
Figure 1: Planned route of the flight

The flight took place according to plans until the last route segment when, after leaving the area of Miskolc, and after passing Ináncs village, the crew perceived significant engine vibration. Then the crew tried to eliminate the malfunction by changing the engine rpm, but the engine produced significant vibration at cruising performance as well.

Subsequently, the pilot with flight instructor certificate agreed with the pilot-in-command that he would take over control of the aircraft, and reduced the engine rpm almost to idle, in order to reduce the vibration caused by the engine. Seeing that the given engine performance was not sufficient to maintain altitude, and accordingly, to reach an airport suitable for landing, so he decided to land the aircraft on available terrain. Flying to north-east along Main Road 3, they saw a pre-harvest, dry grain field on the left-hand side of the road, and a green corn field on the right. The instructor thought that landing on the dry grain field would entail a high risk of fire, while landing on the green corn field offered a significantly better chance of survival, so he chose the latter as the place of their emergency landing. Keeping in mind that the landed airplane should be as easy of access as possible from Main Road 3, the instructor tried to find a place as close as possible to the rainwater ditch (with a depth of ca. 1,5 m) at the unobstructed side (at the point of landing, the

distance between the closer edge of the road and the left main gear of the aircraft was 26.4 m).

After landing, the aircraft stopped following a roll of 108 metres. The instructor managed to land the aircraft in such manner that the 50 to 60 cm high vegetation caused no serious damage to it. After landing, at 12:25, the crew shut down the engine of the aircraft, closed the fuel shut off valve, and turned off electricity.



**Picture 1:** Position of the aircraft with registration mark OK-DAN after it stopped

## 1.2 Injuries

Two people were staying onboard the aircraft during the flight. No one was injured in the event.

## 1.3 Damage to Aircraft

The engine of the airplane malfunctioned during the flight.

The airplane was not damaged significantly during landing.

## 1.4 Other damage

The landing of the aircraft caused treading damage to the corn field.

The IC had no information on any other damage during the investigation.



## 1.5 Information on personnel

### Details of the pilot-in-command:

<b>Age, Nationality, Gender</b>		20, Slovakian, female
<b>License data</b>	<b>Type</b>	PPL(A)
	<b>Professional validity until</b>	31 August 2015
	<b>Medical validity until</b>	11 September 2014
	<b>Certificates</b>	Pilot-in-Command since 09 September 2013
	<b>Ratings</b>	SEP(land)

### Details of the person with flight instructor certificate:

<b>Age, Nationality, Gender</b>		58, Slovakian, male
<b>License data</b>	<b>Type</b>	CPL(A)
	<b>Professional validity until</b>	31 August 2015
	<b>Medical validity until</b>	30 September 2014
	<b>Certificates</b>	Pilot-in-Command since 05 June 1996
	<b>Ratings</b>	FI(A), SEP(land), TMG

## 1.6 Aircraft data



Picture 2: Side view of the airplane with registration mark OK-DAN

### General

<b>Class</b>	fixed wing aircraft
<b>Manufacturer</b>	Cessna Aircraft Company, USA
<b>Type / Subtype (type number)</b>	Cessna 150F
<b>Year of manufacturing</b>	1965
<b>Serial number</b>	150-62642

<b>Registration mark</b>	OK-DAN
<b>State of Registry</b>	Czech Republic
<b>Owner</b>	Letov Air Group s.r.o. (Czech Republic)
<b>Operator</b>	Letecka Skola (Slovak Republic)

	<b>Flight Hours</b>	<b>Number of landings</b>
<b>Since manufacturing till 11 May 2014</b>	6 466 hours	13,398
<b>Date of last 50-hour maintenance:</b>	11 May 2014	
<b>Since last 50-hour maintenance:</b>	No data	No data

### Airworthiness

<b>Airworthiness Certificate (EASA Form 25)</b>	<b>Number</b>	5479
	<b>Date of issue</b>	23 November 2009
	<b>Valid until</b>	Till revoked
	<b>Limitations</b>	shall be operated VFR only
<b>Airworthiness Review Certificate (EASA Form 15b)</b>	<b>Number</b>	5479/2
	<b>Date of issue</b>	13 August 2012
	<b>Valid until</b>	13 November 2014
	<b>Date of last review</b>	14 November 2013

### Engine data

<b>Class</b>	4-cylinder, 4-stroke, boxer engine	
<b>Type</b>	Continental O-200-A	
<b>Manufacturer</b>	TCM	
<b>Serial number</b>	6774-R	
	<b>Hours flown</b>	<b>Number of cycles</b>
<b>Since manufacturing</b>	No data	No data
<b>Since last overhaul</b>	827 hours and 45 minutes	1054
<b>Date of last overhaul</b>	08 December 2002	

### Propeller data

<b>Class</b>	Two-blade metal propeller
<b>Type</b>	1A100MCM6950
<b>Manufacturer</b>	McCauley
<b>Serial number</b>	F1608

Propeller data had no effect on the occurrence therefore detailing them is not relevant.

### Aircraft loading data

Aircraft loading data had no effect on the occurrence therefore these details are not relevant.

## **Faulty system and equipment information**

After a cross-country flight of ca. 3 hours and 45 minutes, at 2100 rpm engine performance, the crew detected significant engine vibration.

During the on-site investigation, the IC rotated the engine crankshaft, using the propeller. During that rotation, significant compression difference was found in the different cylinders

According to data available, disassembly of the engine following the event revealed that a piston ring in the engine was broken, which might have caused further malfunction of the engine, which resulted in the vibration detected by the crew.

### **1.7 Meteorological data**

The event took place at daytime, in good visibility conditions, with no mentionable meteorological phenomena. The weather conditions had no effect on the course of events, so weather needs no detailed analysis.

### **1.8 Navigation aids**

The items indicated in the type certificate were installed in the aircraft; the IC found no problem with and received no comment regarding to the functioning of such items.

### **1.9 Communications**

During the cross-country flight, the aircraft crew maintained two-way radio communication with the competent flight information service.

The communication equipment had no effect to the occurrence therefore detailing them is not relevant.

### **1.10 Airport information**

Take off took place from Bidovce Airport (LZBD) at 08:35 on 19 June 2014.

The scheduled destination airport was the same as the departure airport.

Landing took place in an agricultural land along Road 3 in the outskirts of Forró village, at 12:25. The corn field in the agricultural land was covered with 50 to 60 cm high, green colour plants with relatively soft leaves. The soil was dry and hard, with relatively smooth surface slightly sloping in the direction of the landing.

The geographic coordinates of the aircraft after landing: 48,30878°N; 21,07042°E

### **1.11 Flight recorders**

The aircraft had no flight data recorder; it is not mandatory for the aircraft type affected.

### **1.12 Wreckage and impact information**

There was no wreckage.

### **1.13 Medical and pathological information**

The IC initiated no medical examinations in connection with the event.

### **1.14 Fire**

There was no fire.

## 1.15 Survival aspects

There was no injury.

## 1.16 Test and investigation methods

During the on-site investigation, the IC rotated the engine crankshaft, using the propeller. During that rotation, significant compression difference was found in the different cylinders.

## 1.17 Organizational and management information

### The aircraft operator's organisation:

During the investigation, the IC managed to contact several contact persons from the operating entity of the aircraft who promised to send the data required for the investigation; however, the IC did not manage to contact a person responsible for aviation safety related tasks at Letecká Skola.

During the investigation, the IC did not find it unambiguously proven that the records maintained by the aircraft operator relating to the hours flown by the aircraft and the hours of operation of the aircraft engine are compliant with requirements specified in the chapter M.A.305 Aircraft continuing airworthiness record system, Requirements Part M, Commission Regulation (EC) No 2042/2003.

## 1.18 Additional information

### Keeping and updating of records of aircraft documentation:

“Commission Regulation (EC) No 2042/2003 of 20 November 2003 on the continuing airworthiness of aircraft and aeronautical products, parts and appliances, and on the approval of organisations and personnel involved in these tasks”:

*„M.A.305. Aircraft continuing airworthiness record system”:*

*„g) All entries made in the aircraft continuing airworthiness records shall be clear and accurate. When it is necessary to correct an entry, the correction shall be made in a manner that clearly shows the original entry.*

*h) An owner or operator shall ensure that a system has been established to keep the following records for the periods specified:*

*1. all detailed maintenance records in respect of the aircraft and any life-limited component fitted thereto, at least 24 months after the aircraft or component was permanently withdrawn from service, and*

*2. the total time and flight cycles as appropriate, of the aircraft and all life-limited components, at least 12 months after the aircraft or component has been permanently withdrawn from service, and*

*3. the time and flight cycles as appropriate, since last scheduled maintenance of the component subjected to a service life limit, at least until the component scheduled maintenance has been superseded by another scheduled maintenance of equivalent work scope and detail, and*

*4. the current status of compliance with maintenance programme such that compliance with the approved aircraft maintenance programme can be established, at least until the aircraft or component scheduled maintenance has been superseded by other scheduled maintenance of equivalent work scope and detail, and*

*5. the current status of airworthiness directives applicable to the aircraft and components, at least 12 months after the aircraft or component has been permanently withdrawn from service, and*

*6. details of current modifications and repairs to the aircraft, engine(s), propeller(s) and any other component vital to flight safety, at least 12 months after they have been permanently withdrawn from service.”*

**Quantity of fuel in the aircraft:**

While preparing for flight, the pilot-in-command checked fuel quantity in the fuel tanks of the aircraft, and then filled 62 litres of fuel into the tanks which then were full. The combined capacity of the two fuel tanks is 143 litres (31.5 Imperial Gallons). During the on-site investigation, IC checked the quantity of the fuel left in the fuel tanks of the landed aircraft. The tanks were 1/3 full, which corresponds to ca. 45 to 50 litres of fuel.

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

The investigation did not require techniques differing from the traditional methods used.

## 2. ANALYSIS

The pilot-in-command completed the preflight check at 08:00 on the day of the flight. During the preparation, the crew topped up the fuel tanks of the aircraft (adding 62 litres of fuel) for the planned Bidovce-Miskolc-Budapest-Kecskemét-Bidovce route which takes 4 hours and 20 minutes to fly according to their plans. The combined capacity of the two fuel tanks is 143 litres (31.5 Imperial Gallons).

As reported by the crew, the intended purpose of the flight was to perform navigation tasks abroad. The pilot-in-command had the necessary permits to perform the task, but, as she had not had too much experience with similar tasks, for safety considerations, she invited a pilot with flight instructor certificate as passenger.

During the navigation practice flight, until the engine malfunction, the flight progressed according to plan. The pilot-in-command flew and navigated the aircraft, and the flight instructor was present only as a passenger. When they were in the last segment of the scheduled route, having left the Miskolc district by 30 kilometres, they realised that at the cruising altitude, at ca. 2100 1/min rpm, the engine began to produce strong vibration.

Then the flight instructor, seeing that the engine must have had some sort of technical problem, which would enforce them to perform an unplanned landing on the terrain beneath them, agreed with the pilot-in-command that he would take over control of the airplane.

When choosing the terrain for landing, the crew had the areas shown in Picture 1 to choose from. As seen in the photo, the traffic on Road 3 was fairly busy in both directions, and there were bushes and trees right at the sides of the road, so appropriate, unobstructed space was not available for landing. At the north-west side of the road (to the left in Picture 1) there was a dry wheat land waiting for harvest, and the crew, as well as the IC, found that it was too risky due to potential fire hazard following landing. The area looking suitable for landing was the green field located south-east of the main road (to the right in Picture 1).

The IC reviewed the operation instruction of the type Cessna 150 aircraft; the landing roll length specified in the document is 136 metres. In the case of the affected landing of the aircraft, the distance between the first marks caused to the vegetation and the spot of actual stop was 108 metres. As the wheel marks of the main gears showed no sign of wheel slide between the spots of landing and stopping, the IC concluded that the crew had not applied excessive wheel braking after touchdown but it was the thick vegetation that had slowed the aircraft down, helping it stop with a shorter roll length than the specified 136 metres, despite the down slope in the terrain.

The IC checked the quantity of the fuel in the fuel tanks of the aircraft. During the on-site investigation, the tanks were 1/3 full, which corresponds to ca. 45 to 50 litres of fuel.

The IC inspected the propeller blades, the outer sections of which are shown in Pictures 3 & 4. Both propeller blades show the marks from the green plants clearly, which suggests that the propeller was rotating, and the engine was working, during landing. The mild degree of damage caused by the propeller to the vegetation clearly support that the rotating propeller was working at low engine performance during landing as well as afterwards, during the roll until stop.



**Pictures 3 & 4:** Marks from the vegetation on the outer sections of the propeller blades after the aircraft landed and stopped

During the investigation, the IC reviewed the engine operation hours data made available by the aircraft operator. No data is available about the number of hours and cycles flown since the manufacturing of the engine. The last overhaul of the engine took place on 08 December 2002. According to the records of the aircraft operator, the engine ran 827 hours and 45 minutes in 1054 cycles between the overhaul and the event (19 June 2014). The last CRS (Certificate of Release to Service) of the aircraft prior to the event issue dates 11 May 2014 and shows that the aircraft flew 6466 hours and landed on 13398 occasions between the date of its manufacturing and the date of the said CRS. That CRS was valid until the next 50-hour maintenance which was due at 6516 Flight hours or on 30 November 2014, whichever occurs sooner. The operating entity could not provide flight hours data of the aircraft relating to the period between 11 May 2014 and 19 June 2014 stating that the aircraft was cancelled from the Czechish register in the meantime and the Aircraft Log Book was with the owner that was not available to Letecká Skola anymore.

The IC inspected the TBO (Time Between Overhaul) relating to the engine which is specified by the engine manufacturer in the *Standard Practice Maintenance Manual* for the aircraft operators as 1800 hours flown or 12 years, whichever occurs sooner. According to records of the operator, the engine Flight hours had not yet reached the 1800 hours flown by the time of the event (it was 827 hours and 45 minutes only), and it would have reached the age of 12 years on 08 December 2014, and thus, the IC finds that, according to the records, the next overhaul of the engine was not yet due, although the end of the 12-year period was very close already.

On the basis of data available for the investigation, the IC supposes that the actual number of hours of operation of the engine exceeds the value given by the operator of the aircraft, which may have contributed to the wear and tear of the engine.

The IC received no detailed information on the actual cause of the engine vibration from the operator of the aircraft. The IC was informed by the owner through the Slovakian investigation organisation that disassembly of the engine after the event revealed a broken piston ring in the engine, and that might have caused further engine malfunctions. According to the IC, the malfunction of the piston ring caused a decrease of compression in the affected cylinder, and the engine began to run unevenly and to produce vibration.

### **3. CONCLUSIONS**

#### **3.1 Factual findings**

The flight crew had the appropriate certificates, ratings and experience for the planned flight task. They performed the flight in accordance with the requirements in effect.

The aircraft was found airworthy before the takeoff. It had valid Airworthiness Certificate and Airworthiness Review Certificate. According to its documents, it was equipped and maintained in compliance with the requirements in effects and to the accepted procedures.

The aircraft was sufficiently fuelled for the flight.

The investigation revealed no information on any malfunction of the structure or any system of the aircraft prior to the event which would have contributed to the event or influenced its course.

The flight took place according to plan, in good visibility at daytime and in good weather conditions, but it ended with deviation from the plan, due to the technical problem.

The investigation revealed no information on the activity of the ground personnel or airport parameters which could be associated with the event.

During the investigation, the IC did not manage to contact a person responsible for aviation safety related tasks at Letecká Skola.

During the investigation, the IC did not find it unambiguously proven that the records maintained by the aircraft operator relating to the Flight hours of the aircraft and the hours of operation of the engine are compliant with requirements specified in the chapter M.A.305, Requirements Part M, Commission Regulation (EC) No 2042/2003.

The end of the time interval (based on calendar dates) between the 12-year engine maintenance sessions specified by the engine manufacturer was close already (half a year).

#### **3.2 Event causes**

On the basis of the information available, the IC concluded that the direct cause of the event was that a piston ring in one of the cylinders of the aircraft engine fractured during the flight.

On the basis of the analysis of the data available, the IC supposes that the actual number of the Flight hours of the engine exceeded the value given by the operator of the aircraft, which may have contributed to the wear and tear of the engine indirectly.



## 4. SAFETY RECOMMENDATION

### 4.1 Recommendations issued during the investigation by the Operator/Authorities/etc.

TSB Hungary is not aware of any measure taken by the organisations involved during the investigation in connection with the incident.

### 4.2 Recommendations issued during the technical investigation

During the technical investigation, TSB Hungary issued no Recommendation.

### 4.3 Recommendations issued after the technical investigation

The IC did not find any circumstances that would justify issuance of safety recommendations.

Budapest, 06 December 2017



Ferenc Kamasz  
Investigator-in-Charge



Gábor Torvaji  
IC Member