



**TRANSPORTATION SAFETY
BUREAU OF HUNGARY**

FINAL REPORT

**2013-285-4P
SERIOUS INCIDENT**

**Budapest, LHBP
14 August 2013**

**Boeing B737-800
G-GDFJ**

The sole objective of the technical investigation is to reveal the causes and circumstances of aviation accidents, incidents or irregularities and to initiate the necessary technical measures and draw up recommendations in order to prevent similar cases in the future. The technical investigation is not intended in any way to determine the liability or fault.

THE STATUS OF THE INVESTIGATION

This investigation was carried out on the basis of

- Regulation (EC) 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 December 1944,
- Act CLXXXIV of 2005 on the technical investigation of aviation, railway and marine accidents and incidents (hereinafter referred as Kbv.),
- MET Decree 123/2005 (XII. 29.) on the regulations of the safety investigation of aviation accidents, incidents and irregularities,
- Decree No 70/2015 (XII.1.) of the Minister of National Development on safety investigation of aviation accident and incident, as well as on detailed investigation rules for operators,
- Act CXL of 2004 on the general rules of administrative authority procedure and service unless otherwise specified in Kbv.,

by the Transportation Safety Bureau of Hungary, applying the above provisions appropriately.

The competence of the Transportation Safety Bureau of Hungary is based on Government Decree 278/2006 (XII. 23.).

Under the aforementioned regulations

- The Transportation Safety Bureau shall investigate aviation accidents and serious aviation incidents.
- The Transportation Safety Bureau may investigate aviation incidents and irregularities which - in its judgment - might have resulted in accidents in other circumstances.
- The Transportation Safety Bureau is independent of any person or body whose interest are in conflict with the functions of the investigating body.
- In addition to the aforementioned laws, the Transportation Safety Bureau applies the contents of the ICAO Doc 9760 and Doc 6920 Manual of Aircraft Accident Investigation.
- This Final Report shall not be binding, nor shall an appeal be lodged against it.

No conflict of interest has arisen in connection with the members of the Investigating Committee (IC). Persons participating in the technical investigation shall not act as experts in other procedures concerning the same case.

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 the disclosure of the data pursuant to the relevant act – available to other authorities.

This Final Report

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

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.

DESCRIPTION OF THE OCCURENCE

Occurrence class Serious incident
Aircraft registration G-GDFJ
Aircraft operator Jet2.com
Occurrence location Budapest, LHBP
Occurrence date and time 14 August 2013 23:20 LT

Investigation Committee (IC)

The Director General of the TSB assigned the following Investigating Committee (hereinafter referred to as IC) for the investigation of the incident on 17 July 2016

Investigator-in-Charge (IIC) Gergely Maróti, investigator
IC member Zsigmond Nagy, investigator

Overview of the investigation process

After the event, the IC downloaded and evaluated the data from the flight data recorder, and obtained procedural documents and the captain's event report from the airline. The IC impounded the defective equipment, visually inspected it, and transferred it to the operating company with a request to send it to its manufacturer for detailed testing. The operating company has sent the IC the detailed test report.

Data of the Aircraft

Aircraft category	fixed wing
Aircraft sub-category	large aeroplane
Aircraft type	Boeing B737-804
Aircraft manufacturer	The Boeing Company
Aircraft year of manufacture	2000
Aircraft identification / S/N	28229
Landing gear type	tricycle, retractable
Propulsion type	turbofan
Number of engine(s)	2 pcs

Data of the Flight

Flight Rules	IFR
Purpose of Flight	commercial Air Transport
Location and Time of the Take Off	LTBS, Dalaman, Turkey
Location and time of the arrival	LHBP, Budapest, Hungary

Meteorological Data

Visual conditions	IMC
Light conditions	night
Weather Conditions (METAR / TAF)	METAR LHBP 142330Z VRB01KT CAVOK 15/13 Q1021 NOSIG=

Crew Data

	Position		License category	Medical cert.
1.	Pilot-In-Command	pilot	ATPL	Class 1
2.	Co-pilot (F/O)	co-pilot	ATPL	Class 1

Personal Injuries

No personal injuries during the occurrence.

History of the flight

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ANALISYS

The IC evaluated the data from the flight data recorder. During the climb after takeoff, when the flap control lever was moved to Retract direction, the respective flap actuators in each wing shifted to different extents, which resulted in a slight aerodynamic asymmetry. When detecting the asymmetry, the system monitoring flap movement stopped further retraction.

Troubleshooting explored that erroneous operation was caused by the malfunction of a gearbox (which serves changing directions of output) in the operating mechanism on the right hand side.

Erroneous operation of the equipment was confirmed by a documented bench test performed by the manufacturer of the gearbox; the IC also received the test report from the airline.

According to the test report, signs of wear and cracks can be seen at several points of the internally toothed fitting sleeve (for receiving a spline shaft) located at the end-of-wing side of one of the transmission shafts located at the sides of the drive box. The seal ring responsible for supporting the fitting sleeve and insulating the drive box is absent, as a result of which the connection point responsible for the transfer of force can be shift slightly. Such constant loose fit causes heavy wear and even damage in the long run.

The fault of the equipment was caused by the absence of this supporting and insulating ring. The IC requested the data relating to the history of the gearbox from the operating company, but no entry about the absence of the ring was found, so the way and date of disappearance of the ring cannot be determined. The IC accepts the contents of the test report.

FINDINGS**Event causes**


During the technical investigation the IC concluded that the cause of the incident was/were;

- The absence of the seal ring at the wing-end side output of the drive box, which is responsible for supporting the fitting seal and preventing long-term wear which may occur due to loose fitting of the force transfer point.

SAFETY RECOMMENDATION

The TSB IC did not find such circumstances which would justify the issuance of Safety Recommendations.

Budapest, 24. October 2016

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 Gergely Maróti
 Investigator-in-Charge (IIC)

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 Zsigmond Nagy
 IC member