

Safety Investigation Report

Ref. AAIU-2012-12

Classification: Accident

Level of investigation: Standard

Date and hour: 05 June 2012 at 17:31 UTC

Aircraft: Cessna 152.

Type of engine: One Lycoming O-235-L2C

Accident location: On Saint-Hubert Airfield – EBSH

Type of flight: Cross-country

Phase: Landing

Persons on board: 2 pilots

Injuries: None

Abstract

Upon landing, the airplane bounced once on the runway. The airplane lifted off 2 or 3 meters from the ground. The pilot in command then pushed the stick forward, and the airplane pitched forward and hit the ground nose down.

Cause

The probable cause of the accident is a slightly too high landing speed and a high rolling speed combined with the reaction of the pilot to push the yoke down as a reflex to the bouncing of the airplane, caused by unevenness of the runway surface.

Recommendations: None

Hazard identified during the investigation¹:

Low experience, particularly in landing on grass runways.

Consequence²:

Abnormal runway contact (ARC) and aircraft damages.

¹ Hazard – Condition or object with the potential of causing injuries to personnel, damage to equipment or structures, loss of material, or reduction of ability to perform a prescribed function.

² Consequence – Potential outcome(s) of the hazard

Factual Information

History of the flight

Two students for ATPL licences, both holders of a PPL licence, were flying for the purpose of training, and accumulating flight hours. Flying from Charleroi airport, they decided to go to EBSH, the Saint-Hubert airfield.

They stated it was the first time they were to land on EBSH airfield, a grass runway. They approached runway 14L with a speed of 65 kts in final, with flaps full down.

The airplane touched down 200m after the threshold, rolled for 100m, then bounced once on the runway. The airplane lifted off from the ground. The pilot in command then pushed the stick forward, and the airplane pitched down and hit the ground with the nose wheel first causing a second rebound, higher than the first one, at 2 or 3 meters from the ground.

The nose landing gear broke upon impact when contacting the ground after the second rebound. The pilots climbed out, uninjured.



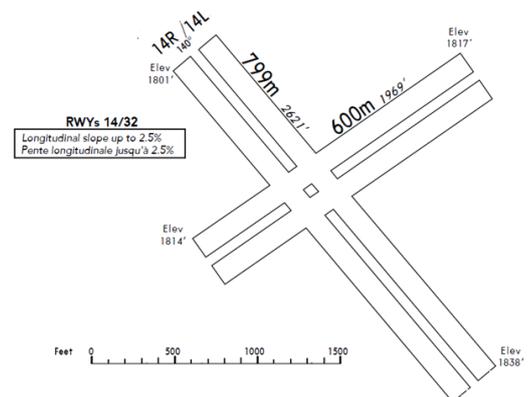
Airfield information

The EBSH Saint-Hubert airfield is an airfield located at 2,5 km NE of the city of Saint-Hubert. Coordinates: 50°02'09"N - 005°24'15"E. Elevation: 563m (1847 ft).

It is equipped with four grass runways:

- 05L/23R and 05R/23L: 600 m long x 42 m wide
- 14L/32R and 14R/32L: 799 m long x 42 m wide

The runways surface is uneven as are many grass runways, and with a noticeable slope.



Aircraft information

The aircraft was registered in Belgium and held a Certificate of Airworthiness and a valid Airworthiness Review Certificate.

Pilot information

Age: 25 years old. Private Pilot Licence, first issued 28 February 2012, valid until 28 February 2017. Rating: SEP (land), valid until 28 February 2014. Medical Certificate: Class 2, valid until 16 December 2012. Total Flight Experience: 92 FH from which 30 FH as PIC and 5 FH since PPL.

The pilot in command reported it was his first landing in EBSH. Before that, most of his training was done in EBCI, on a hard surface runway. His experience with grass surfaces was gained at EBNM, without noticeable problem. Reportedly, the runway surface of EBSH is more uneven than the one of EBNM.

Meteorological information

Visibility: CAVOK, Temperature: 10°C, Wind: 190° 4-8 knots, QNH: 1015 hPa.

Damage

- Rupture of the nose landing gear leg.
- Rupture of the engine mount.
- Scratches and dents on the cowlings.
- Propeller blades bent.
- Deformation to the firewall.

The airplane was declared as being damaged “beyond economical repair”.



Analysis

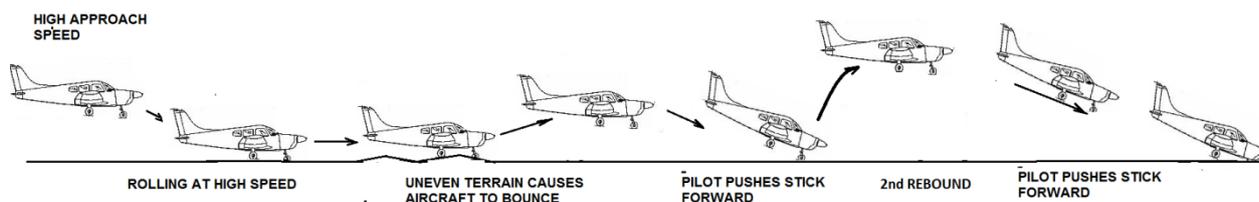
The description made by the pilot of the chain of events that led to the accident illustrates a typical danger related to bounced landings. A bounced landing can be caused by both an improper - too flat - aircraft attitude at touchdown or an improper - too fast - approach and rolling airspeed.

The accident likely occurred after the airplane touched the runway too fast and rolled too fast. Because of the high rolling speed the airplane tended to float and the pilot tried to hold it on the runway when the airplane still wanted to fly. The pilot pushed slightly on the yoke to hold the plane on the runway as he did that regularly when landing on flat concrete or asphalt surface runways.

The irregularities of the terrain combined with the high rolling speed, may have caused the airplane to shoot back in the air. The pilot continued pushing, or pushed the nose down more when the airplane was bouncing, forcing the plane to pitch down and to contact the runway surface on the nose.

Most landing accidents related to rebounds occur after several rebounds. The first rebound with a runway contact on the nose causes the airplane to bounce again, and higher. This phenomenon when repeating is called porpoising³. It may end up in breaking the Nose Landing Gear, as in this case, or may cause a propeller strike.

³ Porpoising is oscillation about the aircraft's lateral axis in the manner of a porpoise.



Another factor is the pilot's landing experience with hard surface long runway, with respect to a short grass runway with an uneven surface. The FAA has issued a series of documents on this subject: "On Landings" documents FAA-P-8740-48, FAA-P-8740-49 and FAA-P-8740-50. The link is hereunder⁴.

Conclusion

Cause.

The probable cause of the accident is a too high speed at landing and a high rolling speed combined with the reaction of the pilot to push the yoke forward as a reflex to the bouncing of the airplane, caused by unevenness of the runway surface.

Contributing factor: the low experience of the pilot, particularly in landing on grass runways.

Recommendations

None, taking into account that the flight school declared the training procedure had been reviewed so as to train student pilots to maintain a slight back pressure on the elevator control during the first portion of the rollout on a grass runway, immediately after touch down.

Additionally, EASA published a Safety Information Bulletin⁵ (SIB N° 2013-20) "Bounced Landing Recognition and Recovering Training" which is worthwhile for Manufacturers, Operators and Training Organizations.

About this report

As per Annex 13 and EU regulation EU 996/2010, each safety investigation shall be concluded with a report in a form appropriate to the type and seriousness of the accident and serious incident. For this occurrence, a limited-scope, fact-gathering investigation and analysis was conducted in order to produce a short summary report.

It is not the purpose of the Air Accident Investigation Unit to apportion blame or liability. The sole objective of the investigation and the reports produced is the determination of the causes, and, where appropriate define recommendations in order to prevent future accidents and incidents.

⁴ [https://www.faasafety.gov/files/gslac/library/documents/2011/Aug/56408/FAA%20P-8740-48%20OnLandingsPart%20I%20\[hi-res\]%20branded.pdf](https://www.faasafety.gov/files/gslac/library/documents/2011/Aug/56408/FAA%20P-8740-48%20OnLandingsPart%20I%20[hi-res]%20branded.pdf)

⁵ SIB N° 2013-20 is enclosed on next pages.



EASA Safety Information Bulletin

SIB No.: 2013-20
 Issued: 19 November 2013

- Subject:** Bounced Landing Recognition and Recovery Training
- Ref. Publication:** Federal Aviation Administration (FAA) Safety Alert for Operators (SAFO) [06005](#), dated 09 June 2006: Bounced Landing Training for certificate holders operating under Title 14 of the Code of Federal Regulations (14 CFR) parts 121 and 135.
- Transport Canada Civil Aviation (TCCA) Advisory Circular [705-007](#): Bounced Landing Training for 705 Air Operators.
- Flight Safety Foundation (FSF) Approach-and-landing Accident Reduction (ALAR) Briefing Note [6.4](#): Bounce Recovery – Rejected Landing
- Applicability:** National Aviation Authorities, Aeroplane Manufacturers, Operators, Training Organisations, Flight Crews.
- Description:** On 23 May 2006 an ATR72-202, while performing a visual approach for Runway 27 at Guernsey Airport, UK, bounced on touchdown due to insufficient landing flare being applied. In an attempt to cushion the second touchdown the co-pilot, who was the handling pilot, over-pitched the aircraft resulting in the tail bumper making contact with the runway surface. The co-pilot was relatively inexperienced, this being his first airline aircraft type, and he could not recall ever having received formal instruction on recovery techniques for bounced landings. The following safety recommendation was issued by the UK Air Accidents Investigation Branch (AAIB): *“The UK Civil Aviation Authority should require UK aircraft manufacturers, operators and training providers to issue appropriate guidance to pilots in the techniques for recovering from bounced landings”*.
- Further analysis of accident and incident data revealed a significant number of similar non type related events. These events were typically, but not necessarily, associated with gusty wind conditions. Several of these events led to a runway excursion with substantial aircraft damage and injuries to passengers and crews.

This is information only. Recommendations are not mandatory.

Evidence suggests that a poorly executed approach and touchdown can generate a bounce that, if not properly identified and managed by the Flight Crew, can result in inappropriate pitching causing premature nose gear contact with the runway or excessive rate of descent. Additionally, various aircraft systems (such as spoilers) can complicate the recovery process.

The purpose of this Safety Information Bulletin is to provide Aeroplane Manufacturers, Operators, Training Organisations, and Flight Crews with recommendations on Pilot training for bounced landing recognition and recovery.

Recommendation(s): Manufacturers are encouraged to provide, where not already available, guidance on bounced landing recovery techniques in the applicable manuals, including relevant Crew Resource Management elements.

Operators and Training Organisations are recommended to ensure that bounced landing recognition and recovery information is available to Flight Crew members and that training is provided to Flight Crews by adequately briefing them on the proper techniques to be used.

Operators' and Training Organisations' training syllabi should include the causal factors that can lead to bounced landings such as:

- excessive sink rate;
 - excess airspeed;
 - late flare initiation;
 - incorrect flare technique and power management;
 - gusty wind conditions;
- (list not exhaustive).

Training syllabi should also include a recommended recovery technique for the specific aeroplane. Recovery techniques should be consistent with the applicable Flight Crew operating and training manuals produced by the Manufacturers.

Operators and Training Organisations are encouraged to use their Safety Management System to assess the risk of bounced landings and mitigate it through appropriate preventive actions such as the ones suggested in this SIB.

Although bounced landing training is intended to be mainly conducted in a classroom or briefing environment, as it should not be deliberately performed in an aeroplane and it may not be adequately replicated in a flight simulator, Flight Simulation Training Devices may be used to train the appropriate recovery technique, taking into account the devices' limitations.

Contact(s): For further information contact the Safety Information Section, Executive Directorate, EASA. E-mail: ADs@easa.europa.eu.

This is information only. Recommendations are not mandatory.