

Safety Investigation Report

Ref. AAIU-2017-AII-05
Issue date: 9 November 2017
Status: Final

SYNOPSIS

Classification:	Accident
Level of investigation:	Standard
Date and time:	8 April 2017 at 11:50 UTC
Aircraft:	JODEL D 92 "Bébé" homebuilt aeroplane
Owner:	Private
Accident location:	Airfield of Tournai / Maubray - EBTY
Type of flight:	General aviation - Local
Phase:	Take-off
Occurrence type:	Loss of control - inflight (LOC-I)
Persons on board:	One pilot – Not injured

Abstract

During take-off, the aeroplane stalled in a right turn movement and violently hit the ground.

Cause(s):

Direct causal factor:

An excessive nose-up attitude leading to a stall during take-off.

Contributing factors:

- The limited pilot experience flying with low inertia aeroplanes, where the aeroplane's attitude and/or airspeed can change with the slightest input on the elevator given by the pilot.
- The pilot being distracted by the presence of family members who were filming his take-off.
- Wrong reflex by pulling on the stick and trying to recover from the incipient spin phase by use of the ailerons.

FACTUAL INFORMATION

History of the flight

The pilot had recently purchased a fully restored 1950 JODEL D 92. One week before the accident, he performed his first flight with this aircraft. This 1h30min flight included 3 take-offs and landings with full stops and 3 or 4 touch and goes, without any apparent problem.

On the day of the accident, the pilot came to the airfield accompanied by family members with the intention to show them his new aircraft and to perform a second flight. The pilot intended to climb to 600 m AGL (Altimeter was graduated in metres) and to perform a series of exercises, including stalls.

The pilot made a pre-flight inspection and filled up the fuel tank (27 litres). After completing the aircraft preparation and enquiring about the weather conditions, the pilot started the engine and proceeded to the threshold of the runway 11.

The pilot stated that the elevator trim was set in take-off position. When the airplane was aligned, he applied full power and the aircraft accelerated normally. When reaching 80-85 km/h, the airplane lifted off. Shortly after, the pilot looked to the right side of the runway where his family was recording the moment on a camera.

The pilot further stated that he was distracted and briefly didn't pay attention to the aeroplane attitude and airspeed.

A few seconds later, when flying between 10 to 20 m AGL, he realized that the aeroplane had an unusual pitch up attitude and that the airspeed was decreasing although the engine was obviously delivering full power. The pilot stated that at that moment, he briefly released the elevator back pressure in an attempt to regain airspeed, but he was unsuccessful. Immediately after, seeing that the aeroplane was pitching down and was losing height, he fully pulled on the elevator control in order to interrupt the loss of height.

The aeroplane stalled in a right turn movement and violently hit the ground at about 200 m from the threshold of the runway. The right-hand wing tip hit the ground first, followed by the main landing gear and finally the engine and propeller. On the ground, the aeroplane rotated to the right with respect to its flight direction and came to a stop about 20 m from the initial ground contact. Due to the shock, the front section of the fuselage, including the engine, the firewall and the fuel tank separated from the fuselage. There was no fire.

Although the aeroplane structure in front of him had disappeared, the pilot remained strapped into his seat and could leave the aircraft, being shocked but without any physical injury.

Damage

The aeroplane was significantly damaged.



Figure 1

Pilot information

License: Private Pilot License (PPL) with a single engine piston (SEP) rating, first issued by the aviation authority of France (DGAC¹) in 1984 and valid up to 31 July 2017.

Experience: Number of flight hours during the last years: about 20 flight hours each year.
About 700 flight hours total flight experience on various single engine aeroplanes as Piper PA 28, Morane 880, Cessna 150. The pilot owns a Morane 880 aeroplane with which he flies regularly. He also has limited experience (about 10 flights) as sailplane pilot.

Medical certificate: Class 2 valid up to 29 July 2017.

Meteorological information

Wind: NNE: 4 kt, Temperature: 18°C, Visibility: CAVOC and QNH: 1024 hPa

Airfield information

The aerodrome of Tournay/Maubray airfield (EBTY) is located 10 km southeast of the city of Tournay, province of Hainaut, close to the French border.

Coordinates: 50°31'47" N 003°29'40" E. Elevation: 49 m / 161 ft

The airfield is equipped with a 640 m long and 18 m wide grass bi-directional runway, oriented 110°/290° that has a slope of 1% (downslope on RWY 29).

The airfield is operated during daytime hours and its use is subject to prior permission from the operator, the association "Tournai Air Club".

Mixed activities: gliders (mostly) and aeroplanes (occasionally).

¹ DGAC: "Direction Générale de l'Aviation Civile", the aviation authority of France

Aeroplane

The JODEL D 92 is a wooden low-wing cantilever monoplane with a single-seat open cockpit and a fixed tailskid landing gear. The wing had an inner section of parallel chord and no dihedral, joined to outer tapered sections with strong (14°) dihedral. The prototype D.9 first flew on the 22 January 1948. Although designed for amateur construction and built in large numbers, it was also built commercially. Over 800 plans have been sold and over 500 aircraft have been built by amateurs and flying clubs.

Accident aeroplane: JODEL D 92, Serial number 11²

- Length: 5,45 m
 - Wingspan: 7 m
 - Wing area: 9,06 m²
 - Empty weight: 185 kg
 - Gross weight: 290 kg
 - Powerplant: Rectimo 4R-1200 flat-four air cooled piston engine (21 kw at 3600 RPM)
 - Propeller: Hélice Leger type AL-1500, diameter 1,33 m
 - Maximum speed: 170 km/h
 - Cruising speed: 130 km/h
 - Fuel capacity: 27 litres
 - Take-off distance: 300 m (at 15 meters above take-off surface)
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- Manufacturer: M. Paul MAZENOT (as indicated on the Certificate of Registration).
 - Individual Airworthiness Certificate first delivered on 3 May 1950.
 - Current Restricted Airworthiness Certificate (CNRA) issued by DGAC on 8 January 1998.
 - Last Airworthiness review performed on 13 May 2016 – Valid until 12 May 2017.
 - Certificate of Registration drawn up in the name of the actual owner on 16 February 2017

² Reportedly, this aeroplane would be, after the prototype, the first home built D 92 to be registered (In France).

ANALYSIS

The event

During the take-off, the pilot applied full power causing a normal acceleration and a rapid lift-off at an airspeed between 80 and 85 km/h. As stated by the pilot, the engine didn't show any sign of anomaly and was obviously delivering full power.

Shortly after the lift off, the pilot was distracted and briefly didn't pay attention to the aeroplane attitude and airspeed when looking at family members.

A few seconds later, when flying between 10 to 20 m AGL, he realized that the aeroplane had an unusual pitch up attitude and that the airspeed was decreasing. He stated that at that moment, he briefly released the elevator back pressure in an attempt to regain airspeed.

From that time, the pitch up attitude decreased, the aeroplane entered in a stall and rapidly lost height. The observation of the video shows that the pilot's reaction was to pull on the elevator control. Immediately after, the aeroplane entered into a nose down right turn, likely being the incipient phase of a spin. The pilot fully deflected the ailerons to counteract the right turn in an attempt to recover a horizontal attitude. His reflex exacerbated the situation by amplifying the asymmetric stall, inducing a spin. The aeroplane was totally out of control.

This situation was clearly initiated by an excessive angle of attack during the first phase of the climb. The airplane did not reach the required best rate of climb speed after lift-off and remained at low airspeed close to the stall speed.

The basic rule of attitude flying prescribes looking outside (under VFR) for about 90 % of the time in order to adequately monitor the aeroplane attitude. Being distracted during the take-off, even for a few seconds, would prevent the pilot from adequately monitoring the aircraft attitude, crucial for safety.

Thorough observation of the video recording

The beginning of the video recording shows neither the roll phase of the take-off nor the lift off. The first picture available shows the aeroplane shortly after the lift off when it is flying in a nose up attitude at about 2 metres from the ground. Two seconds later, the nose up attitude seems to increase while the aeroplane continues climbing. From the start of the video up to 6 seconds, no evidence of large deflection of any flight control is visible and the aeroplane continues to fly in a steep climb. After 6 seconds, the nose up attitude suddenly decreases when the aeroplane is flying at an estimated height between 10 and 20 metres and immediately after, a significant deflection of the elevator (trailing edge goes up) is observed, as a consequence of the pilot pulling on the stick.



Figure 2:
00:00 - normal pitch up attitude



Figure 3:
00:02 - excessive pitch up attitude



Figure 4
00:06 - The aeroplane is flying at a height between 10 to 20 metres. Last moment of high nose up attitude. No visible elevator deflection



Figure 5:
00:06: Begin of the stall: the pitch up attitude is decreasing, prompting the pilot to pull on the elevator control.
The aeroplane develops a sink rate.



Figure 6
00:08: Full nose up action on the elevator control. The aeroplane begins a right turn stall. The ailerons are fully deflected in a reflex to attempt recovering a horizontal attitude.

Weight and Balance

Based on the last weighting report dated 12 May 2016, a swift calculation shows that the weight and balance was within the limits prescribed by the technical file "Dossier CNRA" of the aeroplane.

The weight was approximately at the maximum weight permitted (290 kg) and the centre of gravity was within the prescribed limits.

Human factors

The pilot had a wide experience flying single engine aeroplanes. He was adequately informed about the characteristics of his new aeroplane, available in the “Dossier CNRA”, for the safe conduct of his first flights.

The first flight, performed one week before, during which several take-offs, landings and touches and goes were performed satisfactorily indicates that the pilot was indeed able and ready to go further in flying his JODEL D 92.

After the accident, the pilot himself identified and recognized his own error as being an excessive nose up attitude and the failure to maintain the required speed after lift-off. He identified the root cause of the accident as being distracted by family members standing along the runway, preventing him from adequately controlling the aeroplane’s attitude and thus airspeed. The pilot described his state of mind at the time of the accident in the following terms: “I was excited to fly with my new aeroplane” and “I was happy that my family was present to see my new aeroplane”, which suggests that he was not sufficiently concentrating.

On one side, the pilot was accustomed to fly on a Morane 880 aeroplane that is known to provide a large margin for handling error and on the other side, the JODEL D 92 is very light, with low inertia. This implies that the aeroplane’s attitude and/or airspeed can change to the slightest input on the elevator given by the pilot. It is therefore crucial to be particularly attentive to the aeroplane attitude.

CONCLUSIONS

Findings

- The aeroplane was in an airworthy condition which means registered, covered by a valid Restricted Airworthiness Certificate and a valid Airworthiness Review Certificate.
- The pilot held a valid PPL licence. He was therefore duly licensed for piloting a JODEL D 92 aeroplane, however he had almost no experience flying this type of aircraft.
- During the take-off, the pilot was distracted by the presence of family members who were looking at him and were filming the take-off.

Cause(s):

Direct causal factor:

An excessive nose-up attitude leading to a stall during take-off.

Contributing factors:

- The limited pilot experience flying with low inertia aeroplanes, where the aeroplane's attitude and/or airspeed can change with the slightest input on the elevator given by the pilot.
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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.