

Safety Investigation Report

Ref. AAIU-2023-04-09-01
Issue date: 30 November 2023
Status: Final

Scope: Data-collection only

As per ICAO Annex 13 and EU regulation EU 996/2010, decisions regarding whether to conduct a civil aviation safety investigation, and the extent of an investigation, are based on many factors, including the level of safety benefit expected to be drawn from such an investigation.

For this occurrence, a data-collection only report has been produced, detailing the factual information as received in the initial notification and any follow-up enquiries. In the absence of a deeper investigation, they allow for awareness amongst the aviation community of potential safety issues and possible safety actions. The AAIU(Be) did not verify the accuracy of all information.

SYNOPSIS

Occurrence class	Accident
Occurrence category	Loss of control - ground (LOC-G) Runway excursion (RE) - veer off
Date and time ¹	Sunday 9 April 2023 15:48 UTC
Location	Airport of Kortrijk/Wevelgem (EBKT)
Aircraft	Boeing Stearman Model 75
Aircraft category	Fixed wing - Small aeroplane (MTOW ≤ 5700 kg)
Location of departure	Airport of Kortrijk/Wevelgem (EBKT)
Planned destination	Airport of Kortrijk/Wevelgem (EBKT)
Type of operation	Non-commercial - Cross-country
Phase of flight	Landing
Injuries	None
Aircraft damage	Substantial

What happened

The mission of this local flight was to perform some aerial exercises, west of the airfield. One hour before, the pilot performed another flight with the same aircraft.

The runup was done as indicated in the manual: feet on the brakes, 1700 RPM, magneto check, prop check, low RPM, flight controls. All was fine. All engine instruments were OK, everything 'in the green'. The pilot stated that before departure the wind was full cross from the right on runway 06, but weak and variable, changing by moments towards a slight tailwind. Line up and take-off occurred normal.

¹ All time data in this report are indicated in UTC, unless otherwise specified

After having performed the planned aerial exercises, including steep turns, stall recovery and slow flight, the aircraft headed back, via waypoint W1 to N1, which is a reporting point to be reported and overflowed before entering the visual traffic circuit. The airplane flew further to waypoint N2 before joining downwind leg of runway 06. The pattern was flown at an altitude lower than recommended, i.e. 900 ft (instead of 1000 ft) This altitude was remained till turning final.

The pilot called a first time in when turning final 06, receiving indications of crosswind from AFIS. He re-called on short final and received from the AFIS a wind information of 150°/ 07 kt. The approach speed was 90 mph.

As the pilot was aware that the wind was coming full cross from the right he intended to perform a so-called 'wheel landing'², to maintain sufficient authority over the rudder.

The aircraft touched down at an airspeed of approx. 80-85 mph on both main wheels in the beginning of the runway, but according to the pilot not perfectly on the centreline. The airplane landed on the left side of the centreline, moving outwards. The pilot tried to correct this situation with applying the righthand rudder pedal not touching the brakes. However, very soon thereafter, the tailwheel touched the ground and, from that moment on, the airplane became uncontrollable. The airplane swerved to the right, while the right wing rose, causing the left wing to contact the runway asphalt. The pilot tried to correct with pushing left rudder pedal, but he felt the situation was out of control, and the aircraft was riding on the left wheel of the main landing gear. There was no way to avoid the airplane to move to the right, as the RH wing was up and the crosswind taking into it. The aircraft veered off the runway hitting a runway light with its left main landing wheel.

The main gear dug into the grass causing the engine cowling to hit the ground and subsequently the aircraft to tip over. The ELT was triggered, so although already at lower groundspeed, the deceleration due the impact with was quite high (+2,3 G). The aircraft came to rest inverted on its back.

After realizing what happened, the pilot switched off the magnetos, shut off the fuel valve, and turned off the master switch. Within a few seconds, his passenger and himself opened the buckle of their restraints and fell down on the grass. They could both safely walk away on their own.

There was no smell of fuel neither any sign of fire. Within seconds, the aerodrome rescue services arrived, as well as one police officer.

² Wheel landing: a near-level (or slightly tail low) landing attitude, where the two main tires touch first, and after a while, the tailwheel is gently lowered to the ground. The touchdown is done earlier and at a higher airspeed than with a three-point landing, retaining more rudder effectiveness at the initial landing roll.

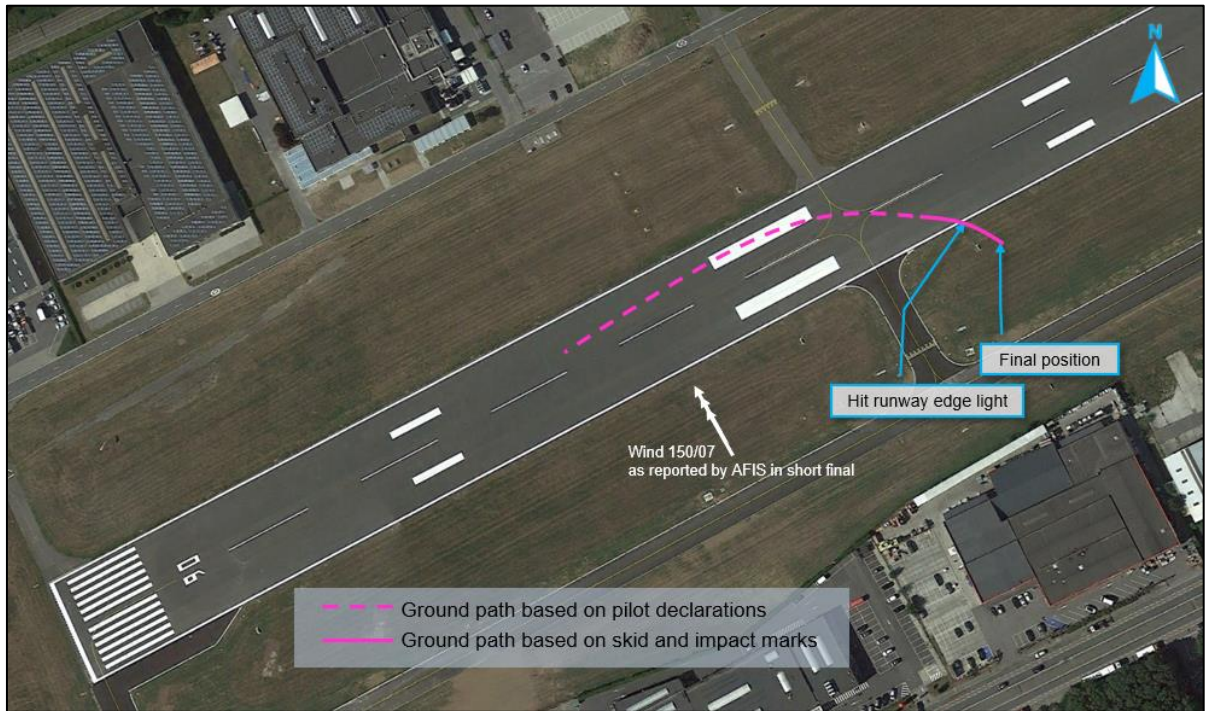


Figure 1 : reconstructed ground path (flight was not recorded with a GNSS system)

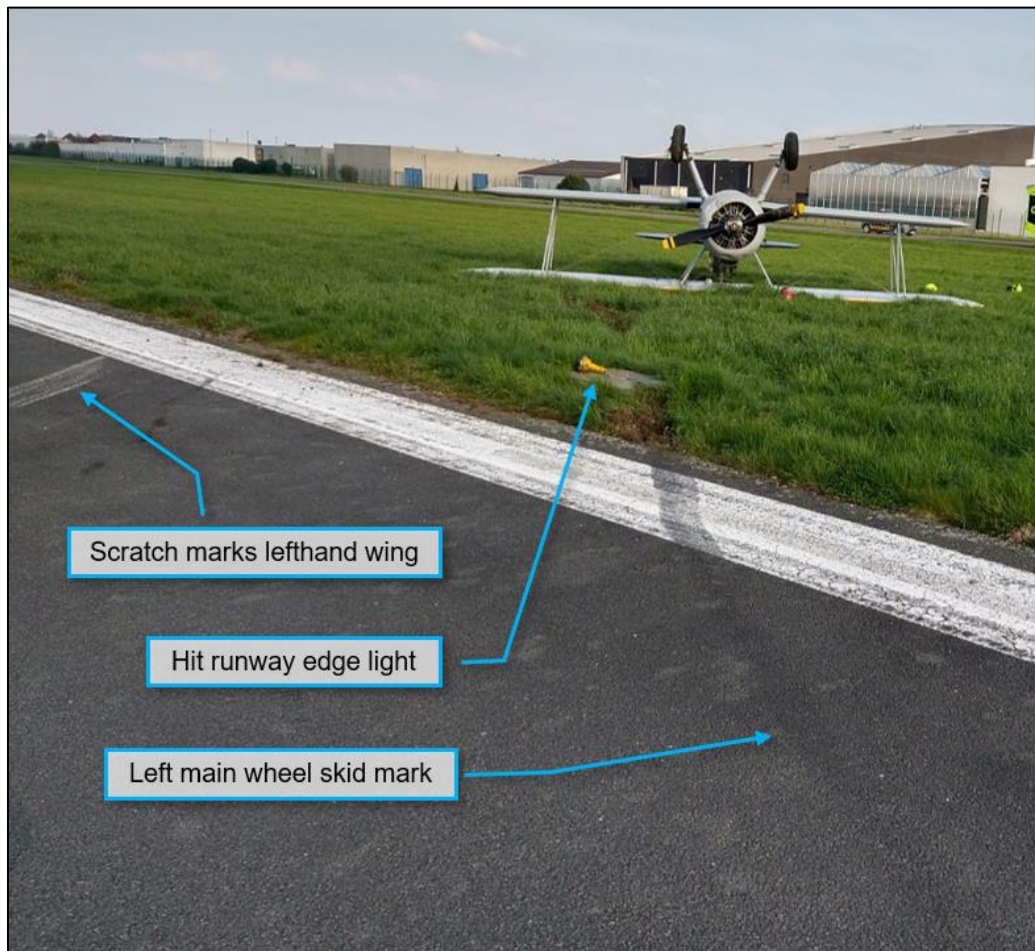


Figure 2 : Final position aircraft

What the AAIU(Be) found as safety topics

Systemic	Organisational	None determined
	Technical	None determined
	Operational	None determined
	Human	Task performance – Aircraft control
	Environmental	Weather - Wind – Crosswind – Effect on operation Operating – Airport facilities – Runway edge lighting – Concrete base – Contributed to outcome

AAIU(Be) comments and message

The accident

The C of G of a taildragger is behind the main wheels which means that on the ground it is inherently unstable directionally as the tail wants to overtake the nose. In a ‘wheel landing’ deviations can still be counteracted by rudder inputs as long as the speed is sufficient enough and the tailwheel is kept of the ground by holding the stick forward.

If the aircraft tailwheel is not steerable and has contacted the ground, it is especially important that airplane and runway heading are exactly the same. It is more important to stay parallel to the runway than it is to stay in the centre. Corrections rudder inputs have to be small (‘tiptoeing’ the rudder pedals).

This loss of control during roll out happened during correction of the position on the runway. The aircraft was rolling to the right when the tailwheel touched the ground. This together with the weathervane effect from the wind coming from the right rendered the aircraft uncontrollable. From that time the pilot couldn’t do anything but accept the aircraft to veer off the runway.

ELT

The peak deceleration due to the aircraft gear that became stuck into the ground, triggered the Emergency Locator Transmitter (ELT). This immediately alerted the Rescue Co-ordination Centre (RCC) Brussels³. Although the registration was sent with this alert, the RCC could only contact the pilot after 20 minutes because they didn’t dispose of his contact details, although being the owner of the aircraft.

Safety message:

It is of utmost and vital importance to, when having an ELT on board, have it completely registered and keep this up to date in the international 406 MHz beacon registration database of COSPAS-SARSAT.

³ This service is located in Beauvechain and is part of the Belgian Air Component. They provide and coordinate the aeronautical Search and Rescue (SAR) services in Belgium.

Environmental

From the interrupted skid and ground mark on Figure 2, it can be deduced that the concrete base of the runway edge light in the grass strip acted like a sort of ramp that caused a small jump. This highly likely increased the final impact forces on the gear and thus contributed to the flip-over of the aircraft. See illustration on Figure 3.

Safety message:

It is advised to aerodrome operators (not only limited to EBKT) to take the above into account when planning infrastructural works on runways and to take into consideration to place the runway edge lights along the edges of the runway area (pavement) itself.



Figure 3

FACTUAL INFORMATION

Damage

To aircraft:

Cowling, propeller, governor, engine, both upper wing skin damage as well as left lower wings and ailerons, torsion on fuselage, distorted fin and rudder.

Other damage:

Runway edge light

Pilot information

Table 1 : General pilot data

Age	49
License	PPL(A) initially issued on 7 August 2014
Medical certificate	Class 2/LAPL valid until 24 July 2024

Table 2 :Flying experience pilot

Total hours	391:17
Total as PIC	264:43
Total on taildragger	Taildragger : 264:31 (included dual) Boeing Stearman : 34:33 (of which 6:41 dual)
Last 90 days:	7:39 (all types), 6:30 (Boeing Stearman)
Last 28 days:	2:36 (Boeing Stearman)
Last 24 hours:	1:48 (Boeing Stearman)

First flight on Boeing Stearman was on 10 June 2021, last flight with instructor on 13 June 2021.

The pilot declared that he did land with crosswind components more often, and more crosswind as well.

Aircraft information

Table 3: Aircraft data

Manufacturer	Boeing (Stearman)
Model:	75 (Kaydet)
Year of built:	1942
MTOW:	1195 kg
Registration	United States of America
Airworthiness	Certificate issued on 22 November 1971 Last annual inspection on 8 July 2022
Total hours:	Airframe was restored in 2021; hours since restoration (June 2021): 49
Engine type:	9-cylinder, radial piston engine
Engine manufacturer and model:	Pratt & Whitney R-985 Wasp
Propeller type:	2-blade, counterweight, clockwise rotating
Propeller manufacturer and model:	Hamilton Standard 2D30

The tailwheel is free to move and is not steerable.

Meteorological information

EBKT 091422Z WIND RWY 24 VRB 4KT MAX9 MNM1 VIS 10KM CLD FEW 4500FT T 16 DP // QNH 1022.1HPA MET QFE 1019.7HPA			
EBKT 091433Z WIND RWY 24 130/4KT MAX9 MNM2 VRB BTN 110/ AND 230/ VIS 10KM CLD FEW 4500FT T 16 DP // QNH 1021.9HPA MET QFE 1019.6HPA			
EBKT 091452Z WIND RWY 24 140/6KT VRB BTN 100/ AND 230/ VIS 10KM CLD FEW 4500FT T 16 DP // QNH 1021.9HPA MET QFE 1019.5HPA			
EBKT 091522Z WIND RWY 24 190/5KT MAX11 MNM2 VRB BTN 120/ AND 210/ VIS 10KM CLD FEW 4400FT T 16 DP // QNH 1021.7HPA MET QFE 1019.3HPA			
EBKT 091723Z WIND RWY 24 100/4KT VRB BTN 070/ AND 170/ VIS CAVOK T 15 DP // QNH 1021.1HPA MET QFE 1018.7HPA			
EBKT 091753Z WIND RWY 24 130/2KT VRB BTN 080/ AND 170/ VIS CAVOK T 15 DP // QNH 1021.2HPA MET QFE 1018.8HPA			
EBKT 091824Z WIND RWY 24 150/2KT VRB BTN 120/ AND 210/ VIS CAVOK T 14 DP // QNH 1021.3HPA MET QFE 1018.9HPA			

Figure 4 : Recorded meteo information at EBKT

The last recorded meteorological data on the airport before the accident was on 15:22 (or 26 minutes before the crash). It can be seen on Figure 4 that both wind direction and speed were variable, changing from righthand crosswind to even tailwind for runway 06 in use.

Aerodrome information

ICAO Code: EBKT
Non-controlled aerodrome, radio and transponder mandatory zone, airspace class G
Aerodrome Flight Information Service (AFIS) with wind data is provided.

Bidirectional runway 06-24
Dimensions: 1900 m x 45 m
Surface: asphalt

Survival aspects

The pilot and the pax wore both a 4-point upper torso restraint.

ABOUT THIS REPORT

General	
What?	Safety investigation reports are a technical document that reflects the views of the investigation team on the circumstances that led to the accident or serious incident and is conducted in accordance with Annex 13 to the Convention on International Civil Aviation and Regulation (EU) No 996/2010.
Objective	The sole objective of safety investigations is the determination of the causes, and to define safety recommendations in order to prevent future accidents and incidents. It is not the purpose of this investigation to apportion blame or liability. In particular, Article 17-3 of Regulation (EU) 996/2010 stipulates that the safety recommendations made in this report do not constitute any suspicion of guilt or responsibility.
Investigation authority	The Air Accident Investigation Unit of Belgium, (AAIU(Be) for the rest of this publication). It is the Belgian permanent national civil aviation safety investigation authority as defined in Article 4 of Regulation (EU) No 996/2010 and established in accordance with the Royal Decree of 26 December 2022. This unit is part of the Federal Public Service Mobility and Transport and is functionally independent from the Belgian Civil Aviation Authority and other interested parties.
This investigation	
Investigation initiation	AAIU(Be) was notified of the incident by phone by ATC provider Skeyes at 16:04. Considering the nature and limited damage it was decided to not travel to the scene of this incident.
Scope	Data collection only As per ICAO Annex 13 and EU regulation EU 996/2010, decisions regarding whether to conduct a civil aviation safety investigation, and the extent of an investigation, are based on many factors, including the level of safety benefit expected to be drawn from such an investigation. For this occurrence, a data-collection only report has been produced, detailing the factual information as received in the initial notification and any follow-up enquiries. In the absence of a deeper investigation, they allow for awareness amongst the aviation community of potential safety issues and possible safety actions. The AAIU(Be) did not verify the accuracy of all information.
Other parties involved	None
	AAIU(Be) would like to thank all entities and individuals that have contributed to this safety investigation.