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Aircraft Accident Investigation Bureau AAIB

Final Report No. 2044 by the Aircraft Accident Investigation Bureau

concerning the accident

to the Beechcraft 35-C33 aircraft, registration HB-EHB

on 9 May 2008

at "Grandchamp", municipality of Boudry/NE

approximately 0.7 km south of Neuchâtel aerodrome

Ursachen

Der Unfall ist auf eine Kollision mit dem Gelände zurückzuführen nach einem Kontrollverlust infolge einer Verkettung von unkorrekten Manipulationen.

General information on this report

This report contains the AAIB's conclusions on the circumstances and causes of the accident which is the subject of the investigation.

In accordance with article 3.1 of the 9th Edition, applicable since 1st November 2001, of the Annex 13 of the Convention on International Civil Aviation of 7 December 1944 and article 24 of the Federal Air Navigation Law, the sole purpose of the investigation of an aircraft accident or serious incident is to prevent accidents or serious incidents. The legal assessment of accident/incident causes and circumstances is expressly no concern of the accident investigation. It is therefore not the purpose of this investigation to determine blame or clarify questions of liability.

If this report is used for purposes other than accident prevention, due consideration shall be given to this circumstance.

The definitive version of this report is the original in the French language.

Unless otherwise indicated, all times mentioned in this report are indicated in the standard time applicable to the area of Switzerland (local time – LT), corresponding at the time of the accident to Central European Summer Time (CEST). The relationship between LT, CEST and coordinated universal time (UTC) is: $LT = CEST = UTC + 2 \text{ h}$.

Final Report

Aircraft type	Raytheon Aircraft Corporation BE 35-C33	Registration HB-EHB		
Operator	Private			
Owner	Private			
Pilot	Swiss citizen, born 1949			
Licences	Private pilot's licence PPL (A), first issued on 07.09.1989 by the Federal Office of Civil Aviation (FOCA)			
Flying time	Total	855 h	during the last 90 days	3:29 h
	on the accident type	442 h	during the last 90 days	1:37 h
Location	"Grandchamp", municipality of Boudry/NE			
Coordinates	556 250 / 200 200 (Swiss Grid)	Elevation	435 m AMSL	
	N 46° 57' 05" / E 006° 51' 50" (WGS 84)			
Date and time	9 May 2008, 10:00 LT			
Type of operation	VFR by day, private			
Flight phase	Go-around			
Type of accident	Loss of control			

Injuries to persons

Injuries	Crew	Passengers	Total number of occupants	Others
Fatal	---	---	---	---
Serious	---	1	1	---
Minor	1	---	1	---
None	---	---	---	Not applicable
Total	1	1	2	

Damage to aircraft	Destroyed
Other damage	Damage to arable land Minor pollution due to fuel

1 Factual information

1.1 History of the flight

1.1.1 General

The description of the flight history is based on the statements of the pilot, the mechanic and witnesses on the ground.

1.1.2 Pre-flight history

On 31 March 2008, the engine on aircraft HB-EHB was removed, having reached its potential limit. It was replaced by an overhauled factory engine. On 8 May 2008, the newly installed engine was operated on the ground for one hour to carry out various adjustments specified by the manufacturer. A meeting was arranged for the next day with one of the owners of the aircraft to carry out a technical flight accompanied by a mechanic.

On 9 May 2008, the mechanic started the aircraft's engine and taxied as far as the refuelling station, where he met the pilot. To prepare for the technical flight, 88 l of AVGAS were added to the tanks.

1.1.3 History of the flight

A briefing took place between the mechanic and the pilot. The objectives of the flight were to check the satisfactory operation of the aircraft and to record different engine parameters during a flight lasting about an hour. The pilot carried out the pre-flight checks and took up his position at the controls. He was then joined by the mechanic, who occupied the front right-hand seat.

After start-up, the aircraft taxied to the spot specified as the run-up point at which the engine and pre-take-off checks are carried out by the pilot using a checklist. Once these had been completed, the aircraft taxied along the runway and was positioned for take-off from runway 05. The brakes were applied, the power was applied, the engine parameters were checked and then the brakes were released. The aircraft accelerated and took off normally.

Once the obstacles had been cleared and the landing gear and flaps had been retracted, the pilot proceeded with the manipulations to reduce power after take-off. At this time, the mechanic noted a drop in the displayed fuel flow, although the manifold pressure value did not vary. Thinking that it was a defect in the mechanical fuel pump, the mechanic engaged the electric auxiliary pump, without resulting in any effect. He then asked the pilot to break off the flight and return to their departure point. The aircraft turned to the right while climbing, with a view to lining up for a final approach on runway 23. The pilot declared the following: *«En approche de la piste 23, mon avion se trouve trop haut et trop vite pour un atterrissage. J'ai tout réduit, sorti le train d'atterrissage et les volets complètement. A la sortie des volets, j'ai observé une vitesse de 100 MPH correspondant à la fin du secteur blanc. Ayant constaté que nous passions la mi-piste, toujours trop haut et trop vite, j'ai remis les gaz en laissant plein volets... Concernant la position du train d'atterrissage, je ne sais pas si je l'ai rentré.»*

Translation:

«On approach to runway 23, my aircraft was too high and too fast for a landing. I had reduced everything, lowered the landing gear and the flaps completely. Once the flaps lowered, I observed a speed of 100 MPH corresponding to the end of the white arc. Having noticed that we passed mid-runway, still too high and

too fast, I applied power while leaving the flaps full down... Regarding the landing gear, I don't know if I have retracted it.»

End of translation.

According to the witnesses, the engine had some failures. At this moment the mechanic noticed that the fuel flow was still low and that 'the engine coughed several times'.

The aircraft then made a 180 degree left turn at a very low height, touched the branches of some trees and ended up in a field of rape.

The left wing hit the ground first, followed by the engine, with the aircraft coming to a standstill after 30m and having rotated 180° around its vertical axis. The pilot turns off the master switch as well as the magnetos. The two occupants were then able to exit the wreckage unaided and assistance soon arrived. Fire did not break out.

1.2 Meteorological information

1.2.1 General

The information contained in sections 1.2.2 to 1.2.3 was supplied by Meteo-Suisse.

1.2.2 General meteorological situation

The stationary anticyclone over Denmark continued to favourably influence the weather in Switzerland.

1.2.3 Meteorological conditions at the location and time of the accident

The following information on local weather conditions at the time of the accident is based on a spatial and temporal interpolation of the observations made by several weather stations.

Cloud	1/8, base approximately 10 000 ft AMSL 4-6/8, base approximately 25 000 ft AMSL
Weather	-
Visibility	Approximately 15 km
Wind	South-east 2 kt gusting to 6 kt
Temperature/dew point	15 °C / 07 °C
Atmospheric pressure	QNH LSGG 1015 hPa, QNH LSZH 1015 hPa, QNH LSMP 1015 hPa
Hazards	None

1.3 Aircraft information

Registration	HB-EHB
Type	BE 35-C33
Characteristics	Four-seater, metal construction, low wings, retractable landing gear
Manufacturer	Raytheon Aircraft Corporation

Year of construction	1967
Serial number	S/N 1903
Engine	TCM Teledyne Continental IO-470-K3B
Year of construction	2008
Serial number	818547-R
Hours since service	1:00 hour
Fuel	AVGAS 100 LL
Propeller type	MC Cauley 2A36C23-DD-G
Serial number	700176
Hours since service	658:11 hours
Certification	VFR by day, private
Airframe hours	4415:53 hours
Capacity of tanks	2 x 40 US gal (308 l) of which 74 US gal (275 l) useable
Fuel on board	Right tank: ~30 US gal (115 l) Left tank: ~30 US gal (115 l)
Mass and centre of gravity	The mass and centre of gravity values were within the limits prescribed by the manufac- turer.
Airworthiness certificate	Standard, normal VFR by day, private Issued by the Federal Office of Civil Aviation (FOCA) on 13 June 2007, valid till further no- tice.
Airworthiness inspection cer- tificate	Issued by the FOCA on 14 February 2008, valid till 29 September 2008.
Maintenance	Latest maintenance work on 9 May 2008: - Installation of a new engine - Airframe 50 hours check
Last periodic inspection	Carried out on 13 August 2007 by the FOCA.
Emergency beacon (ELBA)	Working properly. The emergency beacon was disactivated and dismantled before the arrival of the investigators.

1.4 Additional information

1.4.1 Engine

At the accident site, the installation of the engine and its various connections were checked. The engine was then dismantled and transported to a workshop to be checked on a test bench. The findings are as follows:

“Nous n'avons pas trouvé de dysfonctionnement de montage. Le moteur était conformément installé sur l'avion. Le moteur a fonctionné correctement sur le

banc d'essai sans effectuer d'autre réparation que les dégâts causés par l'accident. Les pressions du carburant ainsi que la pression d'huile étaient dans les valeurs selon le manuel du constructeur. Le test de la chute des magnétos était correct. La seule chose que nous avons constaté: le moteur était un peu riche à haut régime et provoquait un petit étouffement lors d'une réduction rapide de gaz. Ce phénomène est certainement lié au grand choc et à la déformation qu'a subi le système d'injection situé sous le moteur."

Translation:

We did not find any assembly fault. The engine was installed correctly in the aircraft. The engine operated correctly on the test bench without making any repairs other than to the damage caused by the accident. The fuel pressures and oil pressure were within the values according to the manufacturer's manual. The magneto drop test was correct. The only thing we did establish: the engine was running a little rich at high power and was causing minor choking when the throttle was reduced quickly. This phenomenon is certainly linked to the major shock and deformation which the injection system, located below the engine, suffered.

End of translation.

1.4.2 Instruments

The manifold pressure instrument was dismantled and checked. It reacted correctly to pressure variations and displayed a value corresponding to the ambient pressure when it was not connected.

1.4.3 Engine controls

The three engine control knobs, i.e. throttle, propeller and mixture, are of the same colour but of different form and arranged in an "L" shape rotated 90 degrees clockwise. It should be noted that the throttle control is located above the mixture control. Annex No. 1 shows the position of the engine controls as found after the accident.

2 Analysis

2.1 Technical aspects

The various checks carried out on the ground by the mechanic to adjust the engine and then by the pilot before take-off did not reveal any malfunction. The test-bench inspection of the damaged engine confirmed that the engine did not have any anomalies at the time of the accident.

2.2 Operational and human aspects

2.2.1 Origin of the drop in power

According to the statements of the mechanic, the drop in fuel flow occurred during manipulations to reduce power after take-off. In all probability, the pilot pulled on the mixture knob instead of the throttle knob. This is corroborated by the fact that the mechanic, at this precise moment, noticed a reduction in the fuel flow. Thinking it was a fault in the mechanical pump and in accordance with the manufacturer's manual, the mechanic engaged the electric auxiliary fuel pump with the intention of re-establishing an adequate fuel flow. This action, although logical, was unable to remedy the situation because the reduction in flow was a result of the incorrect position of the mixture control, as confirmed after the accident (see annex No. 1).

2.2.2 Conduct of the pilot

Finding that engaging the auxiliary fuel pump did not produce any effect, the mechanic asked the pilot to return to the departure aerodrome. The pilot decided to land on runway 23.

In order to do so, the aircraft made a right turn over the lake. As a result of the trajectory chosen, the right turn near the runway; the pilot could not see the latter until the end of the turn. Consequently, the pilot configured the aircraft too late. As a result, it was flying too high and too fast for a landing on runway 23. The late lowering of the landing gear and the flaps explains the fact that the aircraft passed the midpoint of the runway without being able to touching down.

The pilot then wisely decided to go around, but without retracting the flaps, which were at that time fully extended. Because of the configuration of the aircraft and the lack of power due to the wrong setting of the mixture lever, the aircraft was unable to gain sufficient height. The pilot then turned left in order to be able to land on one of the adjacent fields or on the runway.

The aircraft crashed in a rape field after having touched some trees. By chance, fire did not break out and the occupants were able to exit the wreckage unaided.

3 Conclusions

3.1 Findings

3.1.1 Crew

- The pilot was in possession of the necessary licences.
- There are no indications that the pilot's state of health was affected.

3.1.2 Technical aspects

- At the time of the accident, the mass and centre of gravity values were within the limits prescribed by the manufacturer.
- The investigation did not reveal any technical fault which may have caused the accident.
- The aircraft was equipped with belly safety belts which resisted the deceleration forces.
- The three engine power control knobs are of the same colour and are arranged in an "L" shape rotated 90 degrees clockwise.
- The last maintenance work was carried out on 9 May 2008 after 4415:53 operating hours.

3.1.3 Operational aspects

- The pilot did not analyse the failure when the mechanic asked him to return to the departure point.
- The aircraft lined up too high and too fast for final approach on runway 23 without being configured in time for landing.
- The power control manipulations during the go-around manoeuvre following the missed approach on runway 23 were deficient.

3.1.4 Environment

- Meteorological conditions did not play a part in the accident.

3.2 Causes

The accident is due to a collision with the terrain following a loss of control due to a series of incorrect manipulations.

Payerne, 22 September 2009

Aircraft Accident Investigation Bureau

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Annexes



Annex 1 - Position of the controls after the accident

- A - Throttle control
- B - Mixture control
- C - Electric auxiliary fuel pump switch
- D - Propeller pitch control