

FINAL REPORT ON THE ACCIDENT TO JODEL DR1050 REGISTERED OO-MOU ON KIEWIT AIRFIELD ON 16 AUGUST 2009

**Ref. AAIU-2009-14
Issue date: 15 January 2010
Status: Final**

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FOREWORD

This report is a technical document that reflects the views of the investigation team on the circumstances that led to the accident,

In accordance with Annex 13 of the Convention on International Civil Aviation, it is not the purpose of aircraft accident investigation to apportion blame or liability. The sole objective of the investigation and the Final Report is the determination of the causes, and define recommendations in order to prevent future accidents and incidents.

In particular, Article 13 of the King's Decree of 9 December 1998 stipulates that the safety recommendations made in this report do not constitute any suspicion of guilt or responsibility in the accident.

Unless otherwise indicated, recommendations in this report are addressed to the Regulatory Authorities of the State having responsibility for the matters with which the recommendation is concerned. It is for those Authorities to decide what action is taken.

The investigation was conducted by L. Blendeman.

NOTE: For the purpose of this report, time will be indicated in UTC, unless otherwise specified.

Synopsis

Date and hour of the accident

Sunday 16 August 2009 at 09:45 UTC.

Aircraft

Type: JODEL DR 1050 Ambassadeur
Registration: OO-MOU

Accident Location:

On Kiewit Airfield, EBZH

Aircraft Owner

Privately owned by the pilot

Type of flight

Private

Persons on board

1, slightly injured

Abstract.

The aircraft is based in EBZH, Belgium. The pilot-owner of the airplane decided to fly to EBDT, and participate to the fly-in organised by the Diest Aero-club.

The airplane took off at 08.29 UTC.

The airplane came back from EBDT at 09: 40 UTC; as per procedure, he crossed the airfield to reach the circuit, and land.

There was a second airplane in the circuit, that took off at 09:03UTC to perform a series of touch-and-go.

Realizing the second airplane, lower and to its left, was landing, the airplane broke the approach, and went for a go-around.

When the pilot wanted to increase the power, the engine coughed, and stopped.

The airplane was at that time at the RH side of the airfield. The pilot turned the aircraft to the left in order to come back over the airfield. At that time (probably when turning to the right again), the airplane stalled, and went down, nose first in a corn field next to the landing strip.

1. Factual Information

1.1. Chronology of the events

The aircraft was based in EBZH, Belgium. The pilot-owner of the airplane decided to fly to EBDT, and participate to the fly-in organised by the Diest Aero-club.

The airplane took off at 08.29 UTC.

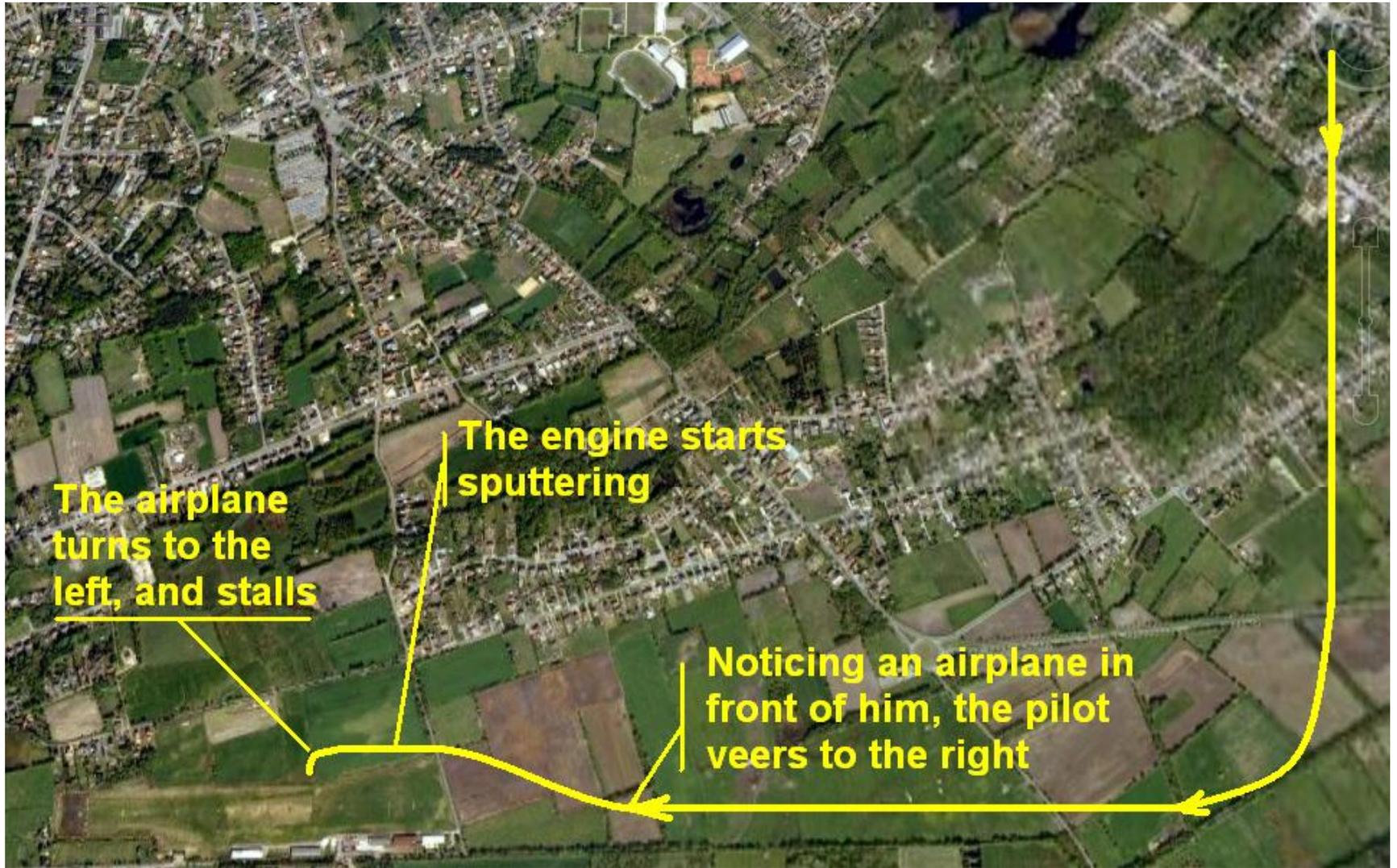
The airplane came back from EBDT at 09: 40 UTC; as per procedure, he crossed the airfield to reach the circuit, and land.

There was a second airplane in the circuit, that took off at 09:03UTC to perform a series of touch-and-go. The presence of this airplane was not noticed by the pilot of OO-MOU, when reaching the circuit of EBZH.

The pilot of OO-MOU noticed the presence of the second airplane when turning on final. The second airplane was in front of him (200m) and lower. The pilot of OO-MOU decide to abort the approach, turned the airplane to the right, to fly parallel to the runway.

When the pilot wanted to increase the power, the engine coughed, and stopped.

The airplane was at that time flying parallel to the landing strip, on the RH side. The pilot turned the aircraft to the left in order to come back over the airfield. At that time, the airplane stalled, and went down, nose first in a corn field next to the landing strip.



The engine starts sputtering

The airplane turns to the left, and stalls

Noticing an airplane in front of him, the pilot veers to the right

1.2. Injuries to persons

Injuries	Pilot	Passenger	Others	Total
Fatal	0	0	0	0
Serious	0	0	0	0
Minor	1	0	0	1
None	0	0	0	0
Total	1	0	0	1

1.3. Damage to aircraft

The airplane is heavily damaged.

The wooden structure of the LH wing is broken, having suffered the initial impact.

The tail structure is shattered.





1.4. Other damage

None.

1.5. Personnel information

Pilot.

Sex: male

Age: 74 years old

Nationality: Belgian

Licence: Private Pilot Licence first issued on 20 September 1973, valid until 9 July 2013.

Rating: Single Engine Piston (Land), valid until 30 April 2010.

Medical: Class II, valid until November 2009.

Proficiency check performed on 26/4/2008 on AA-5A registered OO-RTK.

The pilot had an extensive flight time experience on Single Engine Piston. He flew a total of 3310:68 FH, from which 1468:52 FH on the OO-MOU.

The last 5 years, he flew an average of 44 FH per year, from which an average of 16 FH on the OO-MOU.

In 2009, he flew the OO-MOU for 3:12 FH in July and August.

1.6. Aircraft information

The Jodel DR-1050 is a single engine, low wing three /four seater. It is equipped with a classic landing gear.

The construction is made out of wood and canvas.

This type of airplane was manufactured between 1959 and 1965.

The Type Certificate data sheet N°34 covers the DR100 A model and variants, including the DR 1050 A.

The aircraft type is listed by EASA as an “Annex II Type” aircraft, for which the Basic European Regulation EC1592/2002 does not apply. Note 7 of page 1 of the said document states further:

Certain aircraft (some Jodel series, Emeraude series, including Smargd and Linnet) have been declared as Annex II because of direct similarity with the original Jodel D11 and CP30 aircraft, even though design/production of later variants may not fit in with the 1955/1975 criterion. Similarly, the Beagle Airedale has also been accepted as Annex II as a direct development of the Auster series which are clearly Annex II.

As a consequence, the airplane is not eligible for the issue of a European Airworthiness Certificate, but gets rather a Permit to fly (Laisser-passer de navigation – Luchtvaartpas) for compliance to the Belgian National Airworthiness Requirements.

Airframe

Manufacturer: Société Aéronautique Normande – Aérodrome de Bernay.

Type: DR 1050 Ambassadeur

Serial Number: 399

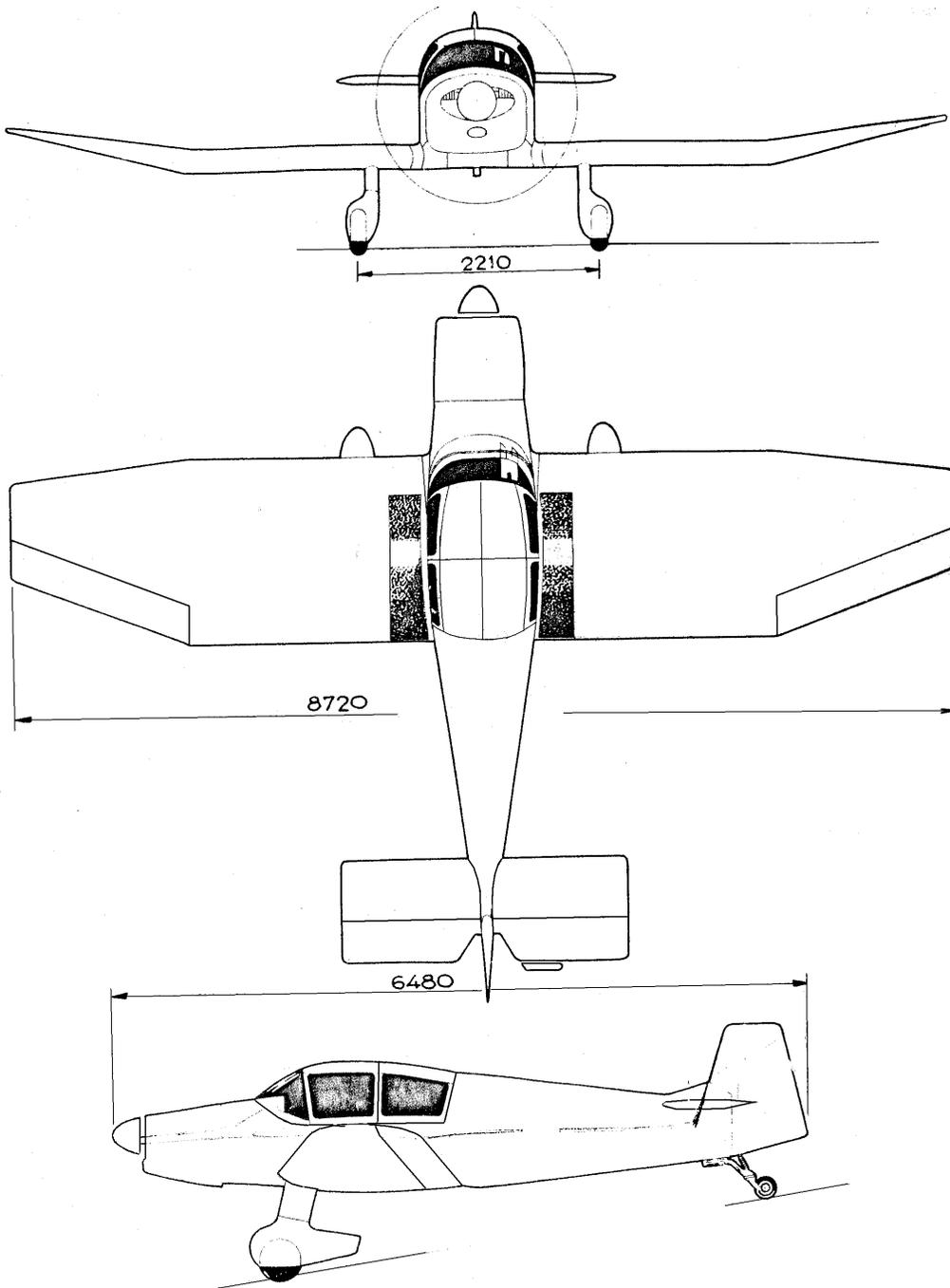
Built year: 1963

Registration: OO-MOU

Certificate of Registration: Nr 2321, issued on 15 February 1978.

Certificate of Airworthiness: Laisser-passer de navigation – Luchtvaartpas
issued on 16 July 2009, valid until 14 July 2010.

Total Flight Hours: 2678 h 11'



Engine

Manufacturer: Rolls Royce
Type: O-200-A
Serial: 25R567
Total Flight Hours: 1511:33 FH

Propeller

Manufacturer: Hoffmann
Type: HO14-170 S123
Serial: 22174
Total Flight Hours: 1485:31 FH

Maintenance

The maintenance was performed by the pilot-owner, as authorized by the Belgian CAA on 12 March 1999. The authorization is limited to the following:

- performance of scheduled maintenance, in accordance with the manufacturer's requirements.
- embodiment of airworthiness directives, as required by the Belgian CAA.
- to perform simple repairs and modifications on the airframe, engine and accessories.
- to perform the annual check for the renewal of the Permit to fly / Luchtvaartpas – Laisser passer de navigation.

The maintenance was performed in accordance with the Belgian CAA requirements. The last annual inspection was performed on 5 July 2009.

During the inspection, the engine and the fuel system was checked, in particular;

- Fuel gauges,
- Fuel selector switch
- Fuel cut-off switch

The electrical fuel pump was not functioning, which was corrected by replacing the circuit breaker. The fuel pump was functioning.

The Fuel system

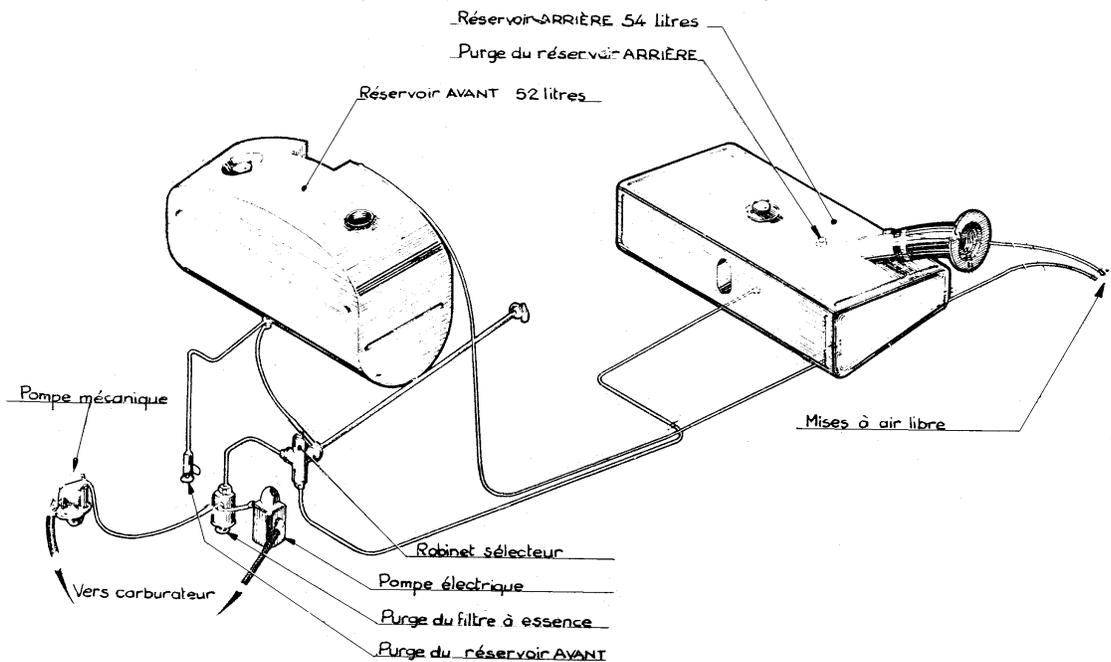
The airplane is equipped with two fuel tanks;

- one forward, behind the instrument board,
- the other aft, under the passenger seat.

The Flight Manual (Edition 1 – December 1965) found in the airplane documentation, and the markings in the airplane indicates the following capacity;

- Forward Tank: 52 liters
- Aft Tank: 54 liters

The Type Certificate data sheet N° 34 (Edition 8 – January 1968) states that both tanks have a capacity of 55 liters, The aft tank has a useable capacity of only 51 liters, the last 4 liters are only useable in cruise flight.



Use of the fuel tanks: Procedure.

The Type Certificate data sheet N° 34 (Edition 8 – January 1968) defines the following procedure:

Take-off and landing using the Forward Fuel Tank.

Should the rear seat be unused (either by a passenger or cargo), use the Forward Fuel Tank first.

If the load on the rear seat exceeds 70 kg; use the Rear Fuel Tank first.

For the intermediate cases, use both fuel tanks alternatively at the fourth of their capacity, start with the Forward Fuel Tank for a forward centering, and with the Rear Fuel Tank in case of a rear centering.

The Flight Manual (Edition 1 – December 1965) found in the airplane documentation, indicates the following procedure (extracts pertaining only to the fuel system):

Before Take-off:

E – Fuel: Forward Fuel Tank selected,
(warning lights extinguished);
fuel pump on.

Climb:

Switch off the electrical pump.

WARNING: the five last liters of the aft tank are not useable in climb.

Cruise:

Use of the fuel tanks.

Avoid an important difference between the 2 fuel tank quantity indicators. The various loading possibilities have an important impact on the balance of the airplane.

- For forward centered airplane, use the forward tank first,
- For aft centered airplane, use the aft tank first.

For intermediate cases, use the tanks alternatively by steps of ¼ of their capacity.

Descend

- Electrical pump on, and Forward tank selected.

The pilot stated that, in a general way, he was using the Forward tank for take-off and landing, and switched to the aft tank in cruise. He was further using the aft tank until empty. This would give him the certainty of maintaining a maximum quantity of fuel in the forward tank.

Fuel Consumption.

The flight manual gives the following figures of fuel consumption for a weight of 750 kg

Puissance % CV	Consommation (l/h)	Autonomy
75% - 76 CV	21.3	5.1
65 % - 66 CV	18.5	6

The owner states he experienced an average consumption of 16-17 l/h.

Owner

The owner of the airplane is the pilot.

1.7. Meteorological information

Observed at EBZH Airfield

Wind:

Direction: 270°

Speed: 04 knots

Visibility: more than 6000 m

Clouds: 1000 ft

Pressure: 1016 mb

Temperature: 18°C

1.8. Aids to Navigation

Not applicable

1.9. Communication

Kiewit airfield can be reached at the following:

Call sign : Hasselt Radio 118.325 MHz (*Info only - no ATC*)

Prior Permission Required (*PPR*) :

00 32 (0)11 21 25 50 * 00 32 (0)475 35 36 47.

OO-MOU is equipped with a radio.

Several witnesses heard a short message 'Kiewit Ground' on the radio seconds before the crash.

1.10. Airport information

Kiewit airfield, called the 'oldest airfield in Belgium', is located 8km N of the city of Hasselt, Limburg. The airfield is operated by day time only.

Address:
Aeroclub Kiewit
Luchtvaartstraat, 100 Bus 1
B - 3500 Hasselt

Coordinates: 50°58'12"N - 005°22'30"E
Elevation: 43m

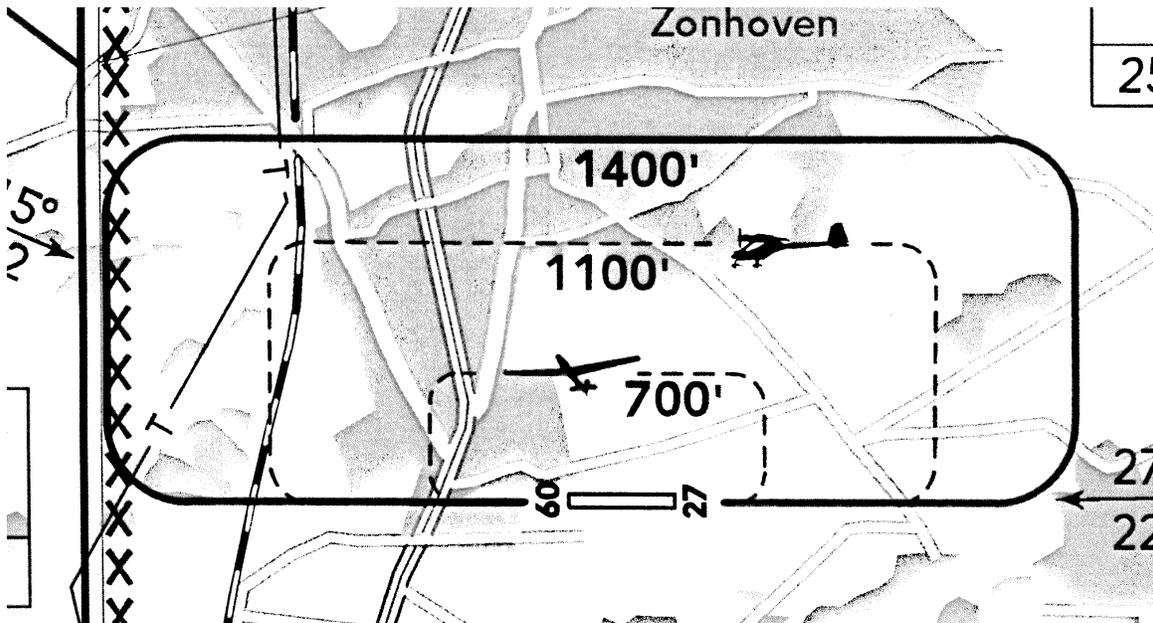
Runway QFU: 090° / 270°

Runway dimensions: 600m x 18m

Surface : grass.

Runway strength : 5700kg

Procedures: RWY 27: right-hand circuit Circuit ALT 1 400 ft



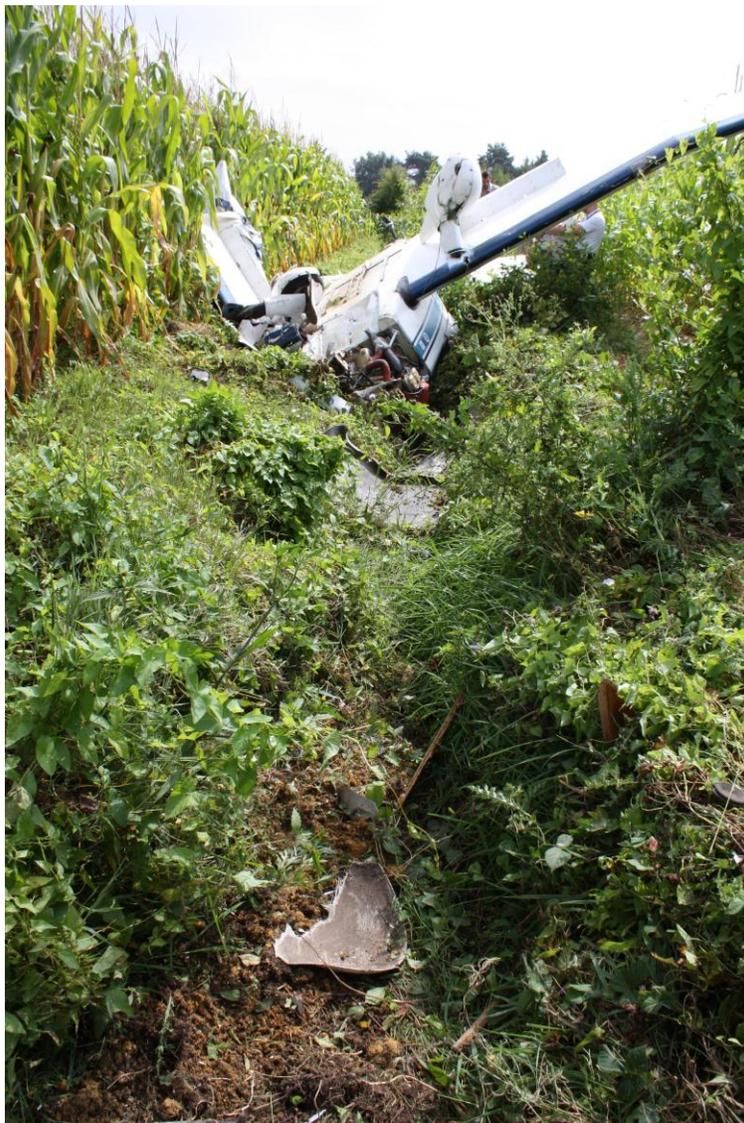
1.11. Flight Recorders

Not applicable

1.12. Wreckage and Impact information

The airplane fell down in a stall. The left wing hit the ground first, and the airplane crashed, inverted, with the fuselage into an irrigation ditch.

This protected the cabin to be further crushed by the airplane hitting the ground.



1.13. Medical and Pathological information

Not applicable.

1.14. Fire

There was no fire

1.15. Survival Aspects

Not Applicable

1.16. Test and Research

Propeller

One blade of the 2-blades wooden propeller was broken, while the other was intact.

Fuel System.

The remaining fuel was drained from the fuel tanks.

The Forward tank was empty.

The aft tank contained 20 liters of fuel.

The fuel tank selector switch was in the "FWD Tank" position.

2. Analysis.

2.1. Engine operation.

The findings on the propeller were consistent with the pilot's statement and witnesses report that the engine stopped in flight. The engine was not delivering power at impact.

2.2. Fuel Planning.

The pilot states he filled up the fuel tanks in July 2009 in EBAW.

The flight log shows the following:

Date	Flight	Flight time	Counter
			2070.30
04/07/2009	Engine run		2070.42
25/07/2009	EBAW - EBZH	43 min	2071.25
28/07/2009	EBZH - EBZW	30 min	2071.55
28/07/2009	EBZW - EBZH	15 min	2072.10
07/08/2009	Local EBZH	40 min	2072.40
16/08/2009	EBZH - EBDT		
16/08/2009	EBDT - EBZH		2074.24

This means an operating time of 3:42 hours, on which we can add the equivalent of 1 hour for the remaining 20 liters of fuel recovered from the aft tank. This means an operating time quite close to the theoretical autonomy of 5 hours indicated in the flight manual.

The difference would come from fuel leaking from the wreckage for an unknown volume, as witnessed during lifting of the wreckage.

2.3. Fuel Management.

The pilot stated that he recalled not having rigorously applied the fuel tank selection procedure during previous flights, and the last flights were mainly done on the forward tank.

The procedure is designed in order to use the aft tank mainly in cruise, so that it empties first, and the switching to the forward tank, (even in the case it runs dry) would happen in cruise, i.e. with sufficient height. This would ensure that the forward tank remains with the most fuel, allowing the landing on the forward tank, located above the carburetor level (positive pressure) to minimize the risk of fuel starvation.

3. Conclusions.

3.1. Findings

- The pilot had a valid Pilot's licence and medical certificate.
- The pilot had extensive flight experience on this airplane.
- The aircraft had a valid permit to fly.
- The airplane was maintained in accordance with the manufacturer's maintenance program.
- There were 20 liters of fuel remaining in the aft tank, while the forward tank was found empty.
- The engine was not delivering power at impact.

3.2. Causes.

The cause of the accident is fuel starvation, causing the engine to stop, when the airplane was maneuvering at low speed and low altitude, resulting in a stall.

4. Safety recommendations.

To BCAA / training school

This accident is a perfect illustration of the importance of following procedures, even for very experienced pilot having an extensive knowledge of the airplane.

We suggest training schools to use the content of this report in human factors courses.