

Investigation Report.

Status:	Final
Date:	23 January 2008
Time:	13:20 UTC
Type:	Reims - Cessna F150M
Operator/Owner:	Air Rent Services
Registration:	OO-RMU
C/N / msn:	CofA: 2970 msn: 1339
Engine(s):	Continental O-200A
Crew:	Fatality: 0 / Occupants: 1
Passengers:	Fatality:0 / Occupants: 1
Aircraft Damage :	Heavily damaged
Location:	Fagnes de Malchamps 3 km S of EBSP.
Phase:	landing.
Nature:	Private flight
Departure Airport:	EBSP – Spa airfield
Destination Airport:	EBCI – Charleroi Airport
Flight Number:	Not applicable

Narrative:

The aircraft took off initially from EBCI. The pilot intended to fly to EBSP, and after a stop, to fly over the circuit of Francorchamps, and return to EBCI.

The pilot took the aircraft at EBCI. He checked the available quantity of fuel; and found there was plenty of fuel for the intended 2h flight (113 l). The pilot also checked the meteo, as usual.

After an uneventful flight, the aircraft landed on runway 23 of EBSP at 12:09. After lunch, they decided to continue the flight. The aircraft took off at 12:58 from EBSP. The pre-flight check-list was performed, involving a carburettor icing check. A performance take-off was performed with 10° flaps.

The aircraft took the direction of Francorchamps, at an altitude of 2400 ft and went circling around the car race circuit at a height of 1000 ft, at an altitude just below the cloud layer. The engine was running at 2500 rpm, mixture rich, and cabin heating on. Above Francorchamps, the pilot selected the carburettor heating controls for 10 –15 seconds. After one turn, the aircraft took the direction of EBCI, the final destination.

REF: AAIU (Belgium) 2008-2.

The ground is a peat bog, quite soft and marshy, and the aircraft decelerated rapidly. The Nose Landing gear hit a trunk and the aircraft overturned.



The aircraft came to a stop 3 km South of Spa airfield (EBSP) on coordinates:

N 50°27,660

E 5°54,162

The area is known as "La Fagne de Malchamps".

Damages:

Aircraft.

The aircraft is severely damaged.

The nose landing gear leg is ripped out of its attachment points.

REF: AAIU (Belgium) 2008-2.



The RH main LG wheel axle is severed.



The engine cowls are damaged.

The aircraft structure suffered heavily.

REF: AAIU (Belgium) 2008-2.

Other.

The aircraft crashed in a harnessing area for potable water, and the gasoline flowing from the aircraft tanks polluted the soil.

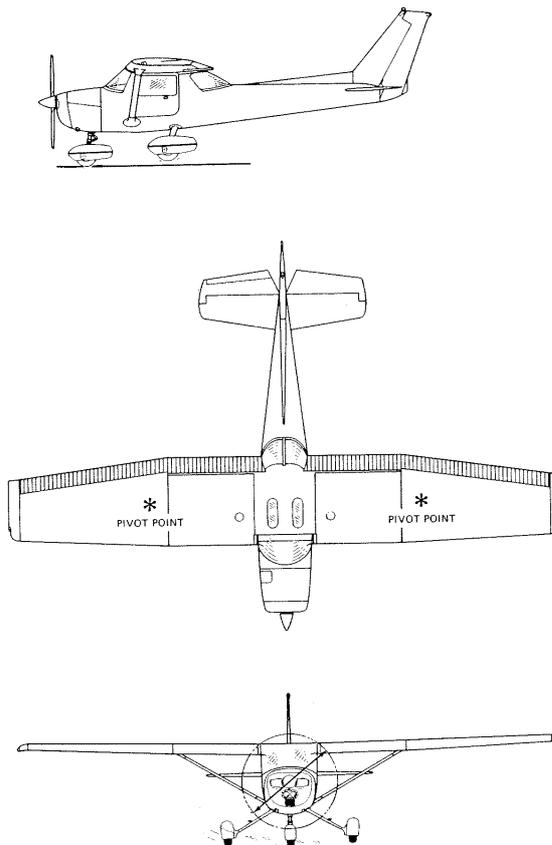
Enquiry:

Pilot.

Sex: Male
Age: 30 years-old
Nationality: Belgian
Licence: PPL (SEP Land), delivered 12/11/2007 valid until 12/11/2012
Medical: Class 1, valid until 05/02/2008

The pilot had a total of 85 FH, from which 29 as pilot-in-command.
All the experience was gained on C150, from April 2006 on.

Aircraft.



REF: AAIU (Belgium) 2008-2.

Airframe

Manufacturer: Reims : Cessna
Type: C 150 M
Serial Number: F15001339
Built year: 1976
Registration: OO-RMU
Certificate of Registration: 2970
Certificate of Airworthiness: 2970, valid until 14 January 2009.
Airworthiness Inspection: Performed on 9/1/2008.
Total Flight Hours: 14232 FH.
TSO: 8182 FH

Engine

Manufacturer: Teledyne Continental
Type: O-200-A
Serial: 285211-R
Power: 100HP
Total Flight Hours: 5259 FH
TSO: 500 FH

Propeller

Manufacturer: Mac Cauley
Type: 1A102/OCM6948
Serial: KK014
Total Flight Hours: 7357 FH
TSO: 499 FH

Owner

Air Rent Services SA
rue Vandervelde, 87
7332 Sirault

Maintenance.

The aircraft was maintained in accordance with the manufacturer's maintenance programme.

All applicable Airworthiness Directives were embodied.

The engine was overhauled in 2007.

The magneto's were maintained iaw TN 89-O1 R3, and installed on 9/1/2008.

REF: AAIU (Belgium) 2008-2.

Meteo.

The meteorological conditions taken on the Spa airfield at the time were:

SPECI EBSP 231323Z AUTO 20011KT 160v230 9999 BKN 011/// 04/01 Q1028.

Location: EBSP – Spa airfield – Special observation.

Date: 23 January 2008.
Time: 13.23 UTC

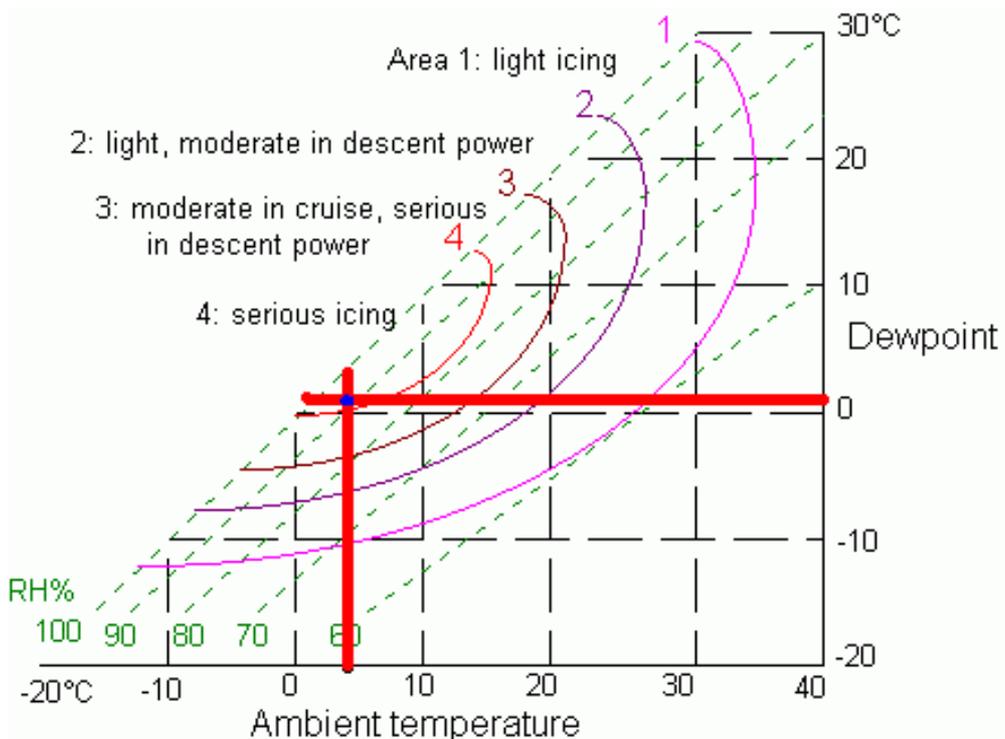
Wind:
Direction: 200° variable 160° to 230°
Speed: 11 knots

Visibility: above 10km

Clouds: Broken clouds 1100 ft

Temperature:
outside temperature: 4°C
Dewpoint: 1°C.

If we report the figures of temperature to the carburettor icing chart, we find:



REF: AAIU (Belgium) 2008-2.

The graph shows that the probability to experience carburettor icing was high, at all engine power settings.

The probability of icing is increased if fuel flow is not leaned – the excess fuel injected into the intake airstream increases the refrigeration.

The danger of icing was identified by the pilot, who applied carburettor heating, as per procedure:

- before take-off
- flying above Francorchamps.

The pilot never experienced real icing conditions in flight before.

Engine.

The engine was inspected and no anomaly was found in:

- the controls – continuity was checked;
- the carburettor, - no obstruction visible and the float valve operated normally.
- the ignition system – both magneto's delivered power to the spark plugs;
- or the air intake – no obstruction visible.

The spark plugs, however, showed signs of abnormal rich mixture.



These conditions are compatible with the icing conditions and the report of witnesses showing “black smoke” through the exhaust.

Conclusions:

Findings

- The pilot had a valid Pilot's licence and medical certificate.
- The aircraft had a valid airworthiness certificate and was maintained in accordance with the manufacturer's maintenance program.
- The aircraft fuel tanks contained sufficient fuel.
- The meteorological conditions induced a "serious icing" probability.
- The terrain on which the aircraft landed is a marshy peat bog.

Causes.

The accident occurred due to the following factors;

- The engine experienced carburettor icing.
- The carburettor heating procedure was not applied after the engine rpm dropped.
- The terrain on which the aircraft landed seems flat from a height, but is in fact a marshy area.
- Loss of situation awareness; the aircraft was in gliding distance of EBSP when the engine problem started.

Recommendations:

To BCAA / Pilot training schools

To emphasize the importance of the dangers of carburettor icing, and stressing the symptoms of icing in flight.

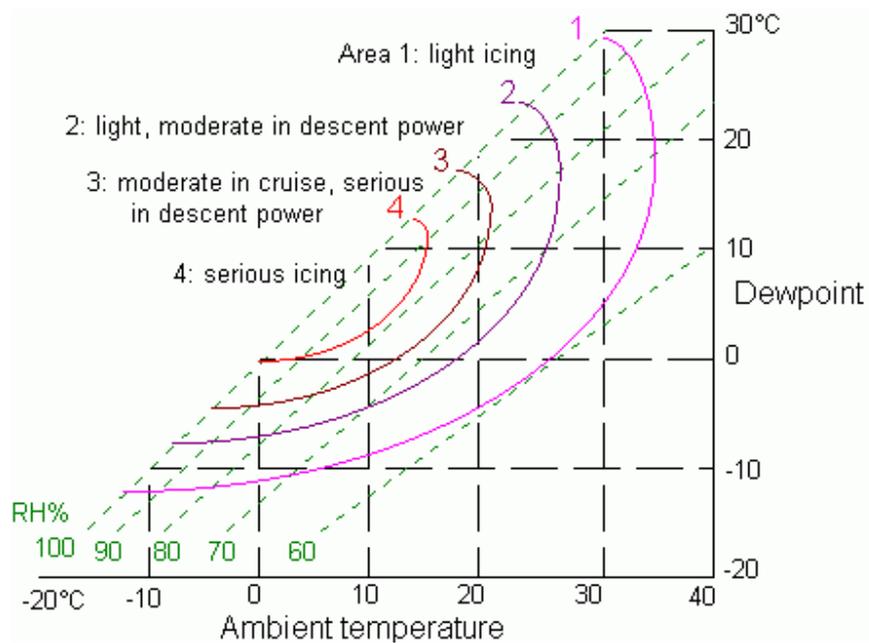
This could be made in the form of a pamphlet. The content could be based on the text hereafter.

CARBURETTOR ICING

1. IDENTIFY THE POTENTIAL DANGER;

1a. Flight Preparation

The formation of carburettor ice is likely to occur in wet, cold air; the diagram hereunder reflects the potential danger



1b. In flight

The pilot should be also aware that in flight, he might encounter locally high absolute humidity.

The air gets cooler with an **increase in altitude** and when **flying near clouds**, the air is likely to be humid.

The probability of icing is increased if **fuel flow is not leaned** – the excess fuel injected into the intake airstream increases the refrigeration.

2. IDENTIFYING THE SYMPTOMS

Carburettor icing will be indicated by

- **a slow decrease in manifold pressure**, in aircraft equipped with a constant speed propeller, or
- **decrease in rpm** in fixed pitch aircraft,

probably with ensuing **rough running** as the ice build-up further restricts the airflow and enriches the mixture.

In other words, and as illustrated by the OO-RMU accident;

- the engine rpm is dropping to a lower level;
- **giving more throttle has no effect.**
- the engine rpm will continue to drop (until the engine eventually stops).

3. CORRECTIVE ACTION

Corrective action is by **FULL application of carburettor heat**, which pre-heats the air entering the carburettor.

Application of partial heat may cause otherwise harmless ice crystals in the airstream to melt then refreeze on contact with freezing metal.

After application carburettor heating, the rough running (**drop in rpm**) of the engine may **increase temporarily** as

- the less dense (warm) air will further enrich an over-rich mixture (this is what happens when you apply carburettor heat in routine on the ground), and
- melting ice will also be caught in the airstream.

However **full heat must be maintained** until the engine eventually settles into smooth running.

Textron Lycoming point out that a pilot should expect a delay of **30 seconds to several minutes** while ice is melted after carburettor heat is applied.

Full carburettor heat should also be applied in conditions conducive to icing, particularly at low throttle settings such as on descent or taxiing, but never on take-off. Carburettor heat will increase the fuel vaporisation in a cold engine.