



Accident to the ROBIN - DR400 - 140B
registered **HB-KBX**
on 8 July 2022
at Culoz

Time	Around 13:00 ¹
Operator	Air-Club d'Yverdon (Switzerland)
Type of flight	Cross-country
Persons on board	Pilot and passenger
Consequences and damage	Aeroplane destroyed
This is a courtesy translation by the BEA of the Final Report on the Safety Investigation. As accurate as the translation may be, the original text in French is the work of reference.	

Engine shut-down in flight, forced landing, overturn

1 HISTORY OF THE FLIGHT

Note: the following information is principally based on the statements collected.

The pilot, accompanied by a passenger, took off at around 10:00 from Yverdon-les-Bains aerodrome (Switzerland) bound for Lyon-Bron aerodrome, the first leg of a cross-country flight of several days in France.

Shortly before 13:00, en route, at a flight he estimated at around 1,000 ft, the pilot felt abnormal heat in the cockpit. He then noted that the needle of the oil temperature indicator was in the red zone. Shortly after, the engine shut down. The pilot could not start it again and prepared for a forced landing. He stated that he adopted the recommended maximum glide speed of 145 km/h, configured the aeroplane for landing and put the aeroplane into the wind. He shut down the fuel supply and switched off the battery. During landing in a corn field, the right wing collided with the ground, the aeroplane tilted over and came to a stop on its back. The pilot and the passenger, unhurt, evacuated the aeroplane.

2 ADDITIONAL INFORMATION

2.1 Site and wreckage information

2.1.1 Examination of the site and wreckage

The damage to the aeroplane and the marks in the vegetation showed that the aeroplane hit the ground with a shallow nose-down attitude, following a path heading north and with a right bank. The nose gear was deformed towards the left rear of the aeroplane. The flaps were extended to the landing position. The nose and rear fuselage of the aeroplane were almost completely separated from the main airframe due to the impact.

¹ Except where otherwise indicated, the times in this report are in local time.

The damage to the propeller, with one blade intact and the other bent backwards, was consistent with the engine shutting down in flight.

There was fuel in the only tank of the aeroplane.

2.1.2 Examination of the electrical system

The examination of the instrument panel, carried out at the BEA facilities found substantial signs of overheating and fusion on the part of the protective sleeves covering the bundle of electrical wires running along the back bottom of the instrument panel (see *Figure 1*). These marks indicated an overcurrent in the aeroplane's electrical system. No other overheating mark was identified on the wreckage.

The runs of melted plastic corresponding to the electric cable sleeve were oriented to the bottom of the instrument panel. As the aeroplane had rolled onto its back after the collision with the ground, this direction of the runs shows that the overcurrent had started during the flight. What exactly caused it could not be determined.

Nevertheless, the examination showed that the overcurrent probably occurred on one of the cables connected to the main electrical bus which supplied all the electrical devices of the aeroplane. The condition of the cables linking the engine magnetos to the selector located on the front of the instrument panel showed that they were not responsible for the overcurrent.

During the flight, the fusion of the protective sleeves of the magneto cables and other cables of the bundle caused electrical continuity. In particular, the magneto cables became connected to the aircraft ground leading to the engine ignition system being cut off and then the engine shutting down.



Figure 1: back of the instrument panel and location of overheating marks (Source: BEA)

The examination of the aeroplane's electrical system revealed that it went through several successive modifications which did not meet the standards set by Robin, the manufacturer.

It was noted:

- the addition of a cigarette lighter socket whose wiring showed overheating marks, probably prior to the accident flight;
- the use of a different type of cable to the other cables of the system and whose wiring seemed unusual;
- the presence of cables no longer in use but kept in place;
- the failure to comply with the cable colour code mentioned in the manufacturer's documentation.

The investigation was not able to identify the organization who was responsible for these modifications nor determine when they were carried out.

2.2 Aeroplane information

The Yverdon flying club owned the aeroplane which was bought second-hand during the 1990s. At the time of the accident, the aeroplane had totalled 12,270 flight hours. It was equipped with a O-320-D2A engine with a two-magneto ignition system.

The aeroplane had been maintained since 2011 by Mecanair maintenance workshop, at Ecuwillens et Yverdon, and before this, by Aero Nord (company taken-over by Mecanair). The documents relating to the maintenance operations and the statements did not mention any work that could have significantly altered the aeroplane's electrical system. The president of the club and the maintenance workshop indicated that all the modifications on the electrical system, in relation with the installation of the cigarette lighter socket for example, took place before the club bought the aeroplane. The installation date of this equipment could not be determined. The pilot indicated that he did not use it. The president of the flying club added that, as far as he knew, the other pilots of the flying club did not use it either.

2.3 Pilot and passenger information

The 57-year-old pilot held an aeroplane private pilot licence PPL(A) issued in 1993 by the Swiss authorities. At the time of the accident, he had logged around 465 flight hours of which 350 hours on the DR400 and one hour in the three months before the accident.

The passenger, also a pilot and a member of the flying club, held an ATPL(A). He had logged around 13,000 flight hours of which 1,500 hours were on single-engine aeroplane and 500 hours on DR400.

2.4 Weather information

Météo-France estimated the meteorological conditions at the time and in the area of the accident. These were a high-pressure pattern and with a mostly north to north-east wind, moderate to strong, causing probably light to moderate turbulences on the mountains and in their vicinity, as well as a clear sky to few clouds.

3 CONCLUSIONS

The conclusions are solely based on the information which came to the knowledge of the BEA during the investigation.

Scenario

During a flight between Yverdon-les-Bains and Lyon-Bron, an overcurrent in the electrical system of the aeroplane caused the protective sleeves of some cables to fuse together and the appearance of electrical continuity. The magneto cables became connected to the aircraft ground, leading to the engine ignition system being cut off and then the engine shutting down. The pilot carried out an off airfield forced landing during which the right wing collided with the ground and the aeroplane turned over. The cause of the overcurrent leading to the overheating of certain cables behind the instrument panel could not be determined.

The BEA investigations are conducted with the sole objective of improving aviation safety and are not intended to apportion blame or liabilities.