



Accident to the ROBIN - DR400 - 140B registered F-GBIA

on 16 June 2019

at Saint Cyr l'École (Yvelines)

⁽¹⁾ Unless otherwise stated, all times given in this report are in local time.

Time	Around 20:00 ⁽¹⁾
Operator	Aéroclub de Boulogne Billancourt
Type of flight	Cross-country
Persons on board	Pilot and one passenger
Consequences and damage	Aircraft destroyed
This is a courtesy translation by the BEA of the Final Report on the Safety Investigation published in June 2020. As accurate as the translation may be, the original text in French is the work of reference.	

Engine shutdown on downwind leg, forced landing in a field, collision with a fence

1 - HISTORY OF THE FLIGHT

Note: the following information is based mainly on statements.

During a flight from Deauville Normandy aerodrome (Calvados), the pilot, who was accompanied by a passenger, joined the traffic pattern of Saint Cyr l'École aerodrome. On the downwind leg, he reported to the controller that he was experiencing engine problems. The pilot landed in a field. During the landing run, the aircraft hit a fence, the nose gear failed and the aircraft came to rest a few metres further on.

2 - ADDITIONAL INFORMATION

2.1 Pilot experience and information

The 56-year-old pilot, who held a PPL (A) private pilot licence, had logged 255 flight hours, including approximately 4 hours 30 minutes in the preceding 90 days, all on the F-GBIA DR400 .

2.2 Pilot's statement

The pilot indicated that, during the stopover at Deauville, according to the gauges, the main fuel tank was about half full and the range extension tank three-quarters full⁽²⁾.

After take-off from Deauville, the pilot followed the Seine for the return flight. He stated that, after take-off, he pulled the lever to transfer fuel from the range extension tank to the main tank.

⁽²⁾ The aircraft's fuel system is described in Chapter 2.7.

About 15 minutes before landing at Saint-Cyr-l'École aerodrome, he announced his arrival over the control tower frequency. Before entering the downwind leg, the pilot activated the electric fuel pump and carburettor heat.

While on the downwind leg into runway 29 at a height of 700 feet, the pilot indicated that the engine stopped and then started hard for three seconds. He checked the position of the electric fuel pump and carburettor heat controls. He also pushed and pulled on the range extension fuel transfer lever. The engine stopped again and then restarted briefly before coming to a complete stop. Because he was at a low height, the pilot indicated that he did not attempt to restart the engine. He spotted a green wheat field for the forced landing and managed to reach it. During the landing run, the aircraft hit a green fence obscured by the vegetation, which the pilot had not spotted.

The pilot secured the aircraft before evacuating it with the passenger.

2.3 Passenger statement

⁽³⁾The passenger stated that he had no knowledge of aircraft.

The passenger⁽³⁾ indicated that, on approach to Saint Cyr l'École aerodrome, an initial engine power loss occurred, followed by two more before the engine stopped completely. The pilot pulled on the throttle and carried out checks. He pulled the range extension fuel lever. The engine then stopped. All was quiet. They had not yet crossed the A12 motorway. The pilot reported the problem to the tower. The pilot landed in a field just past the motorway.

2.4 Meteorological information

At the time of the accident, the Météo-France readings indicated a wind of 240°, blowing at 6 to 7 kt, visibility greater than 10 km, no clouds and an air temperature of 21°C.



Figure 1: position of the aircraft in relation to Saint Cyr l'École aerodrome

The accident site was located approximately 1,500 m north of Saint Cyr l'École aerodrome ([Figure 1](#)). The aircraft was located in a wheat field, whose plantings were around 60 cm high.

Before coming to rest, the aircraft hit a fence on the edge of this field. This fence was a green colour. It comprised posts and wire mesh and was approximately

1.20 m high. Upstream of this fence, the tracks of the main landing gear could be seen over a distance of about 12 m for the left landing gear and about 7 m for the right landing gear.

The aircraft was secured by the pilot immediately after the accident. All the controls were placed in the OFF position. The range extension fuel tank transfer lever was found in the 'pushed in' position (not activated).

An examination of the wreckage did not reveal any damage or faults that could explain the engine shutdown. The presence of fuel was noted in the fuel system, except for in the hose between the mechanical pump and the carburettor.

2.6 Engine examination

No external damage was found when the engine was examined. The engine was tested on ENAC's engine test bench in Castelnaudary. Its operation was nominal.

Further examination and testing of the carburettor, the mechanical pump and the electric pump did not reveal any faults that could explain the engine shutdown in flight.

2.7 Description and examination of the fuel system

A flow diagram of the fuel system is shown below:

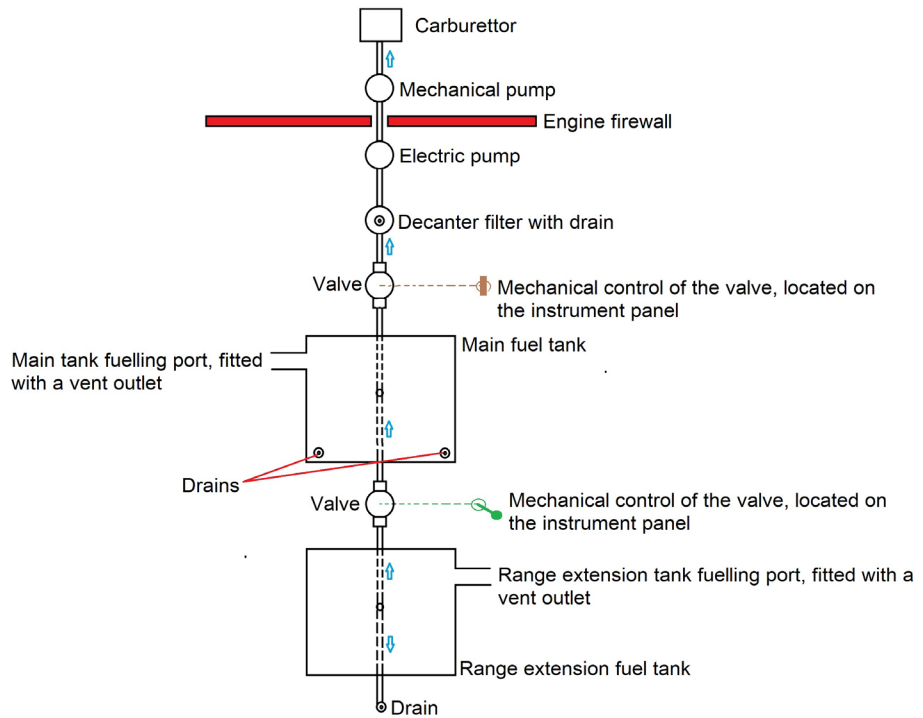


Figure 2: flow diagram of the fuel system

⁽⁴⁾ The F-GBIA flight manual states that the last 10 litres can only be used in level flight.

⁽⁵⁾ The range extension fuel tank cannot supply the engine directly. The fuel contained in it must be transferred to the main fuel tank before it can be used. Prior to making the transfer, the pilot must ensure that a sufficient quantity of fuel has been consumed in the main fuel tank to prevent it from overflowing via the vent.

All fuel system components were in place and no leaks were detected.

No pollution was found in the various filters, strainers and drains on any of the components of the system or in the two fuel tanks.

An analysis of the fuel sample taken from the aircraft did not reveal any anomalies.

The main fuel tank, which has a capacity of 110 l⁽⁴⁾, was undamaged and contained about 50 l of fuel.

The range extension fuel tank, which has a capacity of 50 l⁽⁵⁾, was not damaged and contained no fuel. Its drain was operational.

The valve for transferring fuel from the range extension fuel tank to the main fuel tank was operational.

The test performed on the wreckage showed that it took five minutes to transfer 10 l of fuel from the range extension fuel tank to the main fuel tank.

⁽⁶⁾ Inconsistencies in the aircraft's logbook meant that this estimate could not be validated.

⁽⁷⁾ Calculation of the average fuel consumption using information from the F-GBIA's flight manual and logbook.

2.8 Fuel consumption

According to the pilot's statement regarding the position of the gauges, the pre-flight fuel quantity can be estimated at about 55 l in the main fuel tank and about 37 l in the range extension fuel tank⁽⁶⁾.

The average fuel consumption of the F-GBIA is about 30 l per hour⁽⁷⁾. The running time of the engine from start-up at Deauville to shutdown was approximately 82 min. Consequently, the fuel consumed during this period was approximately 41 l.

Without the fuel transfer from the range extension fuel tank, the amount remaining in the main fuel tank would have been about 10 l, which is the limit beyond which engine power is no longer guaranteed if the aircraft is not in level flight.

The total amount of fuel on board the wreckage (50 l) is consistent with the amount of fuel estimated by the pilot before the flight and the assumed fuel consumption during the flight. Its distribution (fuel contained in the main fuel tank only) confirms that the system for transferring fuel from the range extension fuel tank to the main fuel tank was indeed activated between take-off and the moment the BEA investigators made their observations.

3 - CONCLUSIONS

The conclusions are solely based on the information which came to the knowledge of the BEA during the investigation. They are not intended to apportion blame or liability.

Following a cross-country flight and arrival on the downwind leg, the pilot experienced several engine misfires before the engine stopped completely. He made a forced landing in a field, during which the aircraft hit a fence.

The examinations of the fuel system and engine revealed no indication of a malfunction.

The manner in which the engine stopped is compatible with a case of unpriming of the fuel system. Given the amount of fuel estimated by the pilot before the flight and the assumed fuel consumption during the flight, there may have been insufficient fuel remaining in the main fuel tank to supply continuous fuel to the engine. This hypothesis assumes that there was no fuel transfer from the range extension fuel tank to the main fuel tank before the first misfires were observed.