



Accident to the Piper PA19
registered **F-HLOG**
on **23 August 2021**
near **Lille - Marcq-en-Barœul aerodrome (Nord)**

Time	Around 15:55 ¹
Operator	Union Aérienne Lille Roubaix Tourcoing (UALRT) flying club
Type of flight	Local
Persons on board	Pilot and passenger
Consequences and damage	Pilot and passenger fatally injured, 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 failure after a touch-and-go, loss of control in turn,
collision with ground and fire**

1 HISTORY OF THE FLIGHT

Note: the following information is principally based on radar data and statements.

The pilot, accompanied by a passenger², took off from runway 35³ at around 15:30 to carry out a local flight west of the aerodrome. Approximately twenty minutes later, on the return leg, he joined the left-hand downwind leg for runway 35.

The pilot carried out a touch-and-go. Witnesses reported that the aeroplane took off on the last third of the runway. They then saw smoke coming out of the plane in initial climb at a height they estimated at 100 ft. The pilot turned onto the crosswind leg and announced over the radio that he was going to carry out a “short circuit”. Other witnesses, situated under the flight path, perceived a reduction in the engine speed. They estimated the height of the aeroplane as being at 300 ft. The pilot then started a left turn, but lost control of the aeroplane a few seconds later. The aeroplane immediately caught fire after the collision with the ground.

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

² The passenger was the flying club secretary and did not hold an aviation licence.

³ “Aeroplane” runway, refer to paragraph 2.1.

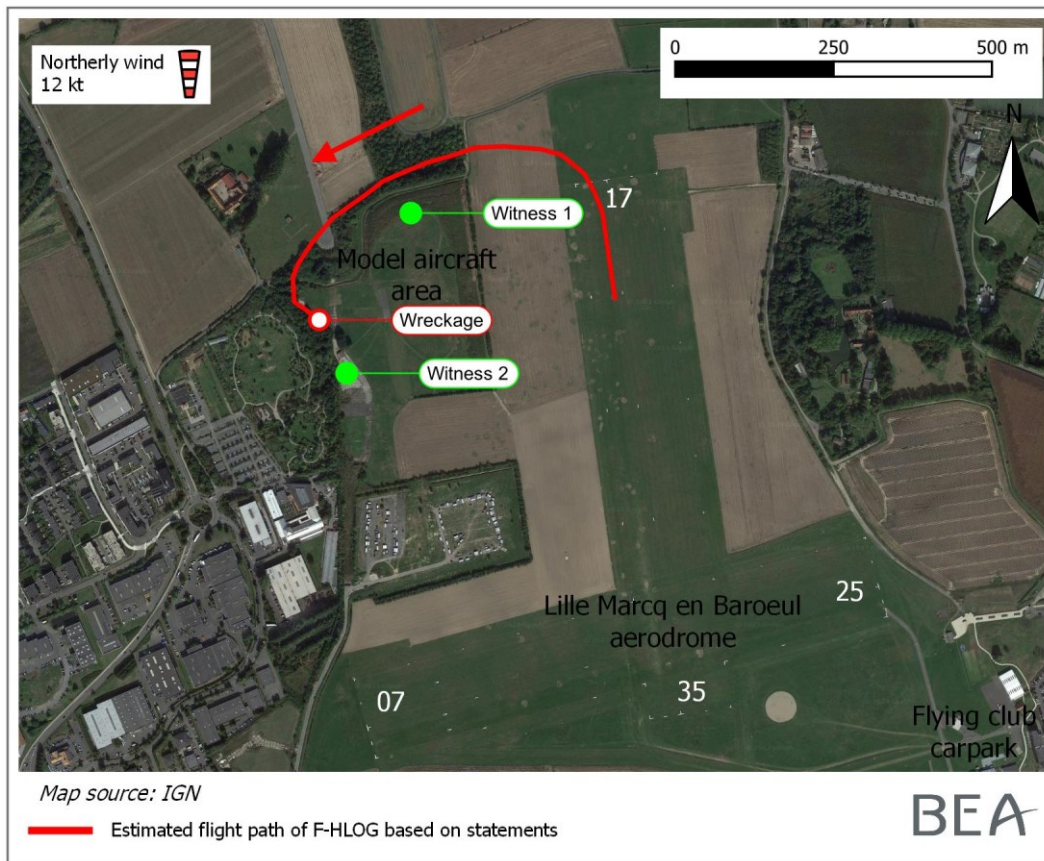


Figure 1: flight path estimated by witnesses (annotated by the BEA)

2 ADDITIONAL INFORMATION

2.1 Aerodrome information

Lille – Marcq-en-Barœul aerodrome has four intersecting grass runways: two joined runways 17/35, one for aeroplanes and the other for gliders, and two runways 07/25 with a similar configuration.

“Aeroplane” runway 17/35 measures 850 x 50 m. The take-off distance available (TODA) on runway 35, used by the pilot of F-HLOG, is 850 m, the published runway circuit is left-hand and the axis is clear of obstacles over approximately 800 m. There are built up-areas to the west and south of the aerodrome.

The aerodrome is on flat grass ground with no obstacles.

2.2 Meteorological information

The French met office, Météo-France, estimated that the conditions at the time of the accident were:

- northerly wind of an average speed of 12 kt, with gusts at 18 kt;
- visibility greater than 10 km;
- scattered clouds at an altitude of 4,000 ft and broken clouds at 3,000 ft.

2.3 Aircraft information

The stall speed, with zero bank, given in the aeroplane flight manual is 44 mph. The PA19 was not equipped with a stall warning system, this was not a regulatory requirement for this aeroplane.

The weight and balance were within the limits defined by the manufacturer.

The flight manual specifies that:

- in the event of an engine failure after take-off: maximum left or right heading change of 30°, keep 59 mph on the airspeed indicator;
- in the event of an in-flight engine failure: flight speed 70 mph, speed on final in straight flight 56 mph.

The flight manual specifies that for the maximum weight (681 kg) at sea level:

- the take-off distance is 230 m;
- the landing distance is 225 m;
- the landing run distance is 120 m.

Between 18 and 20 August 2021, the aeroplane underwent a 50 hours – 100 hours – 1 year inspection incorporating the following additional operations:

- cleaning of fuel trap filter;
- verification of differential pressures of cylinders;
- replacement of carburettor heating unit.

After these operations, the aeroplane logged around five flight hours.

2.4 Site and wreckage information

The accident site was located 500 m west of the end of runway 35, near the model aircraft area (see **Figure 1**).

The wreckage was grouped together, completely burnt and oriented 120°. The aeroplane had collided with the ground with zero bank and a nose-down attitude of more than 30°.

The flight controls were continuous.

The crankshaft freely rotated one eighth of a turn (deformations prevented a full turn). There were no obvious signs of engine damage. The engine was removed and found to contain asbestos residue, the firewall having been badly damaged by the fire.

Initial observations showed that:

- the oil sump was cracked as a result of the impact with the ground;
- the crankshaft was deformed as a result of the impact with the ground;
- all the electrical (including magneto) and fuel systems were destroyed by the fire.

2.5 Examination of engine

The examination of the engine (a Continental C90-8F manufactured in 1952) required particular precautions due to the presence of asbestos.

There was still oil in the engine when it was disassembled.

The examination revealed the rupture of part of the left half-crankcase, around the thread of one of the studs, in line with a crankshaft bearing.

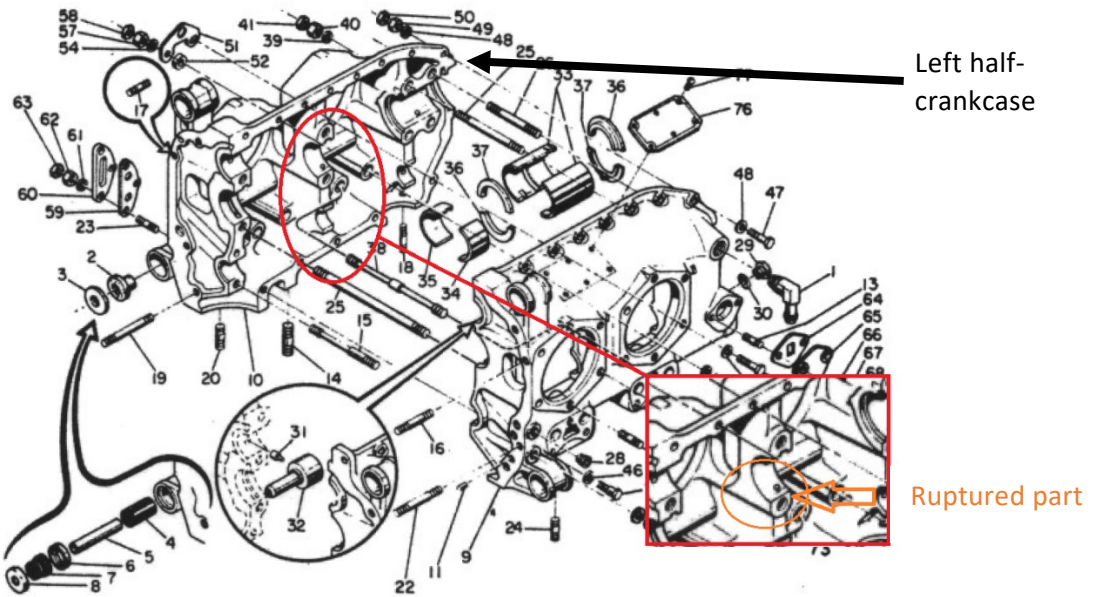


Figure 2: view of rupture of left half-crankcase (source: Continental, annotated by the BEA)

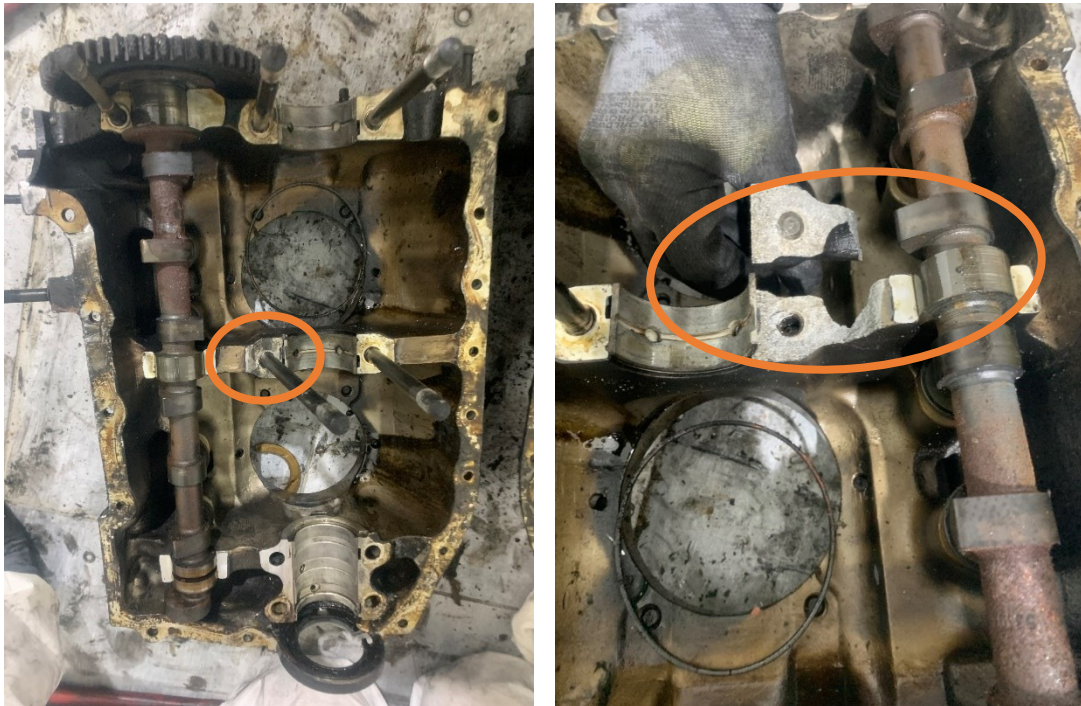


Figure 3: view of rupture of left half-crankcase (source: BEA)

This engine underwent a second general overhaul in October 2020. At that time, it had logged 3,191 operating hours since its entry into service and 1,867 hours since the previous general overhaul. On the date of the accident, the engine had logged around 100 operating hours since the last general overhaul.

The examination of the rupture in the BEA laboratory showed that the aeroplane's engine crankcase fractured slowly and progressively under a fatigue cracking process, until its final sudden rupture during the accident flight. It was not possible in the laboratory to reliably and precisely date the start of the cracking. However, the cracking spread from the core to the exterior of the crankcase. It would not have been possible to detect it during the various general overhauls as it had probably not opened out onto the surface at the time of the checks.

The engine manufacturer, Continental, indicated that it did not know of a similar fault on this engine model. It added that if the crankcase was maintained in accordance with the manufacturer's maintenance documentation, it had an unlimited service life.

2.6 Pilot information

The 31-year-old pilot held an aeroplane Commercial Pilot License (CPL(A)) obtained in the United Kingdom in 2018, along with the Instrument Multi Engine Rating (IR/ME). He also held an aeroplane Flight Instructor rating (FI/A), obtained in 2018. He obtained a basic pilot certificate (BB) in 2009 and an aeroplane Private Pilot Licence (PPL(A)) in 2013. He also held a Sailplane Pilot Licence (SPL) obtained in 2019.

Between April 2019 and February 2020, the pilot had carried out additional training at a flight training school in the scope of joining an airline company. The pilot obtained the TW (Tail Wheel⁴ landing gear) approval during this training after eight flight hours in dual control on a Cap 10.

In April 2021, at the time of his last revalidation of his Single Engine Piston (SEP) rating, the pilot declared that he had flown a total of:

- 770 aeroplane flight hours including 510 hours as pilot-in-command (350 hours as instructor);
- 25 glider flight hours, including 13 hours as pilot-in-command.

In the summer of 2021, the pilot flew around 20 hours in the flying club, including 17 hours as an instructor, mainly on the DR400.

This was the pilot's fourth flight on the PA19. He had completed:

- two instruction flights of 35 minutes each at the beginning of April 2021 (including six landings), at the end of which the pilot was approved for solo flights on this aeroplane;
- a 75-minute cross-country flight (between Lille - Marcq-en-Barœul aerodrome and Merville-Calonne airport), as pilot-in-command on 31 July 2021⁵ (including four landings).

Apart from these two hours and twenty-five minutes of flight on the PA19 registered F-HLOG, the pilot had principally flown the DR400 for the past two years.

⁴ Conventional landing gear.

⁵ The flying club's Operations Manual requires one flight, in the previous three months (recent experience on the PA19). The head of training may, however, authorise a pilot to fly without carrying out a familiarisation flight, according to his or her experience.

2.7 Autopsies and post-mortem medical examinations

The autopsies and toxicological analyses carried out on the two victims did not reveal any signs of them breathing in the presence of a fire. The hypothesis of incapacitating smoke in the cockpit between the take-off and the collision with the ground seems to be unlikely.

2.8 Statements

Two witnesses located in the aerodrome carparks, a helicopter pilot who took off a few seconds after the pilot and three other witnesses located in the model aircraft area provided the following information:

- none of the witnesses heard a radio message from the pilot on final, stating his intentions;
- the witness in flight indicated that the aeroplane touched down halfway down the runway. He added that the aeroplane seemed to lack power on take-off;
- most of the witnesses observed smoke coming out of the underside of the aeroplane during the initial climb (at around 100 ft) and during the crosswind leg;
- two of the model aircraft witnesses (see **Figure 1**, witnesses 1 and 2), under the flight path before the loss of control, indicated that the engine stopped or slowed down considerably;
- the witness in flight and two witnesses located in the model aircraft area indicated that the aeroplane then made a left turn which became tighter to return towards an obstacle-free area of the aerodrome.

3 CONCLUSIONS

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

Scenario

Back from a local flight with a passenger, the pilot carried out a touch-and-go.

It is probable that the final rupture of a component inside the crankcase occurred after power was increased to take off again. This rupture in line with a crankshaft bearing was caused by previous fatigue-cracking type damage. The rupture probably generated vibrations and affected the oil system inside the engine, which gave rise to excess oil in a cylinder, generating smoke which escaped via the exhaust, as observed by several witnesses.

This engine fault was probably detected by the pilot as on the crosswind leg, the pilot announced that he was going to fly a "short circuit". No distress or emergency message was transmitted.

Before the turn onto the downwind leg, the engine speed decreased. This was either the result of a pilot input or the engine fault. The pilot lost control of the aeroplane during the turn.

Contributing factors

The pilot's small amount of experience on the PA19 may have contributed to the loss of control in the turn. He probably focused his attention on the engine fault to the detriment of monitoring the speed.

Safety lessons

Engine failure in initial climb

When an engine fault occurs during initial climb, the pilot must, despite the startle effect and stress, quickly decide on a plan of action. S/he can either:

- carry out a forced landing straight ahead, in particular in the event of a major failure where climb or level flight is not possible;
- carry out a runway circuit adapted to the environment and circumstances, in particular in the event of a minor failure. This assumes that the power available allows level flight to be held.

In the latter case, the pilot must be aware that the situation may deteriorate at any moment. S/he will then be obliged to amend her/his plan of action.

Maintaining the appropriate airspeed for the chosen bank angles will enable the pilot to maintain control during manoeuvres.

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