



Accident to the CESSNA - F177RG
registered **F-GAAC**
on 24 February 2021
at Veuzain sur Loire

Time	14:18 ¹
Operator	Private
Type of flight	Cross country
Persons on board	Pilot and passenger
Consequences and damage	Pilot slightly injured, aeroplane substantially damaged

This is a courtesy translation by the BEA of the Final Report on the Safety Investigation published in February 2023. As accurate as the translation may be, the original text in French is the work of reference.

Loss of power en route, forced landing

1 HISTORY OF THE FLIGHT

Note: the following information is principally based on data from the SDVFR navigation application used by the pilot and on statements.

After a stopover of approximately one hour and thirty minutes, the pilot, accompanied by a passenger, took off at 14:06 from Amboise Dierre aerodrome (Indre-et-Loire) for a return flight to Étampes Mondésir (Essonne), where the aircraft was based and from where they had taken off that morning. Five minutes after take-off, the aeroplane reached the maximum altitude of 1,600 ft QNH, (i.e. a height of 1,420 ft). The pilot then adopted a downward path that caused the Cessna to fly over Amboise chateau at a height of 650 ft, which was the lowest point of the path. During this flight phase, he followed the river Loire at a reduced speed of around 115 kt, keeping the river on his right.

At 14:16, at a height of 700 ft, the pilot detected engine spluttering. He started troubleshooting, but his actions had no effect on the engine, which was gradually losing power. Losing altitude and realising that, given his height he had no other choice, the pilot then directed the aeroplane into an area roughly ahead of him to make an emergency landing.

Once in this sector, he hesitated between two nearby fields before choosing the field which was shorter but had the clearest approach. He then extended the landing gear and the flaps and landed with a light tailwind component.

He made contact with the ground without any particular incident. Despite the pilot's braking action, the aeroplane continued its run into the ploughed field located in the immediate extension of the

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

landing area. After a few metres, the nose wheel collapsed due to the aeroplane's quick deceleration because of the change in the type of soil. The pilot struck the sunshield and suffered a superficial injury to his forehead. His passenger was unharmed.

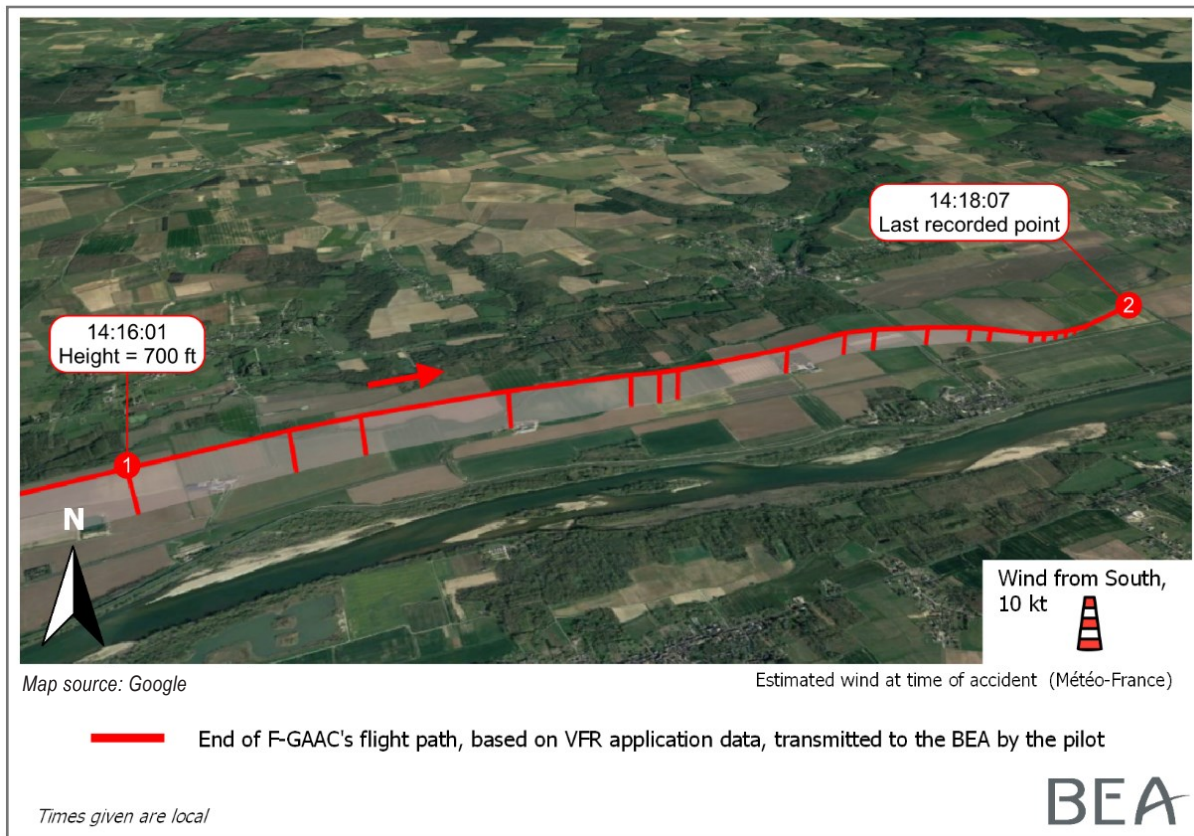


Figure 1: flight path of F-GAAC

2 ADDITIONAL INFORMATION

2.1 Site and aircraft information

The aircraft was located in the middle of a field with a zero slope and a clear approach roughly oriented 055°, between a railway track on the right and two B roads, one on the left and the other, 50 m further on.

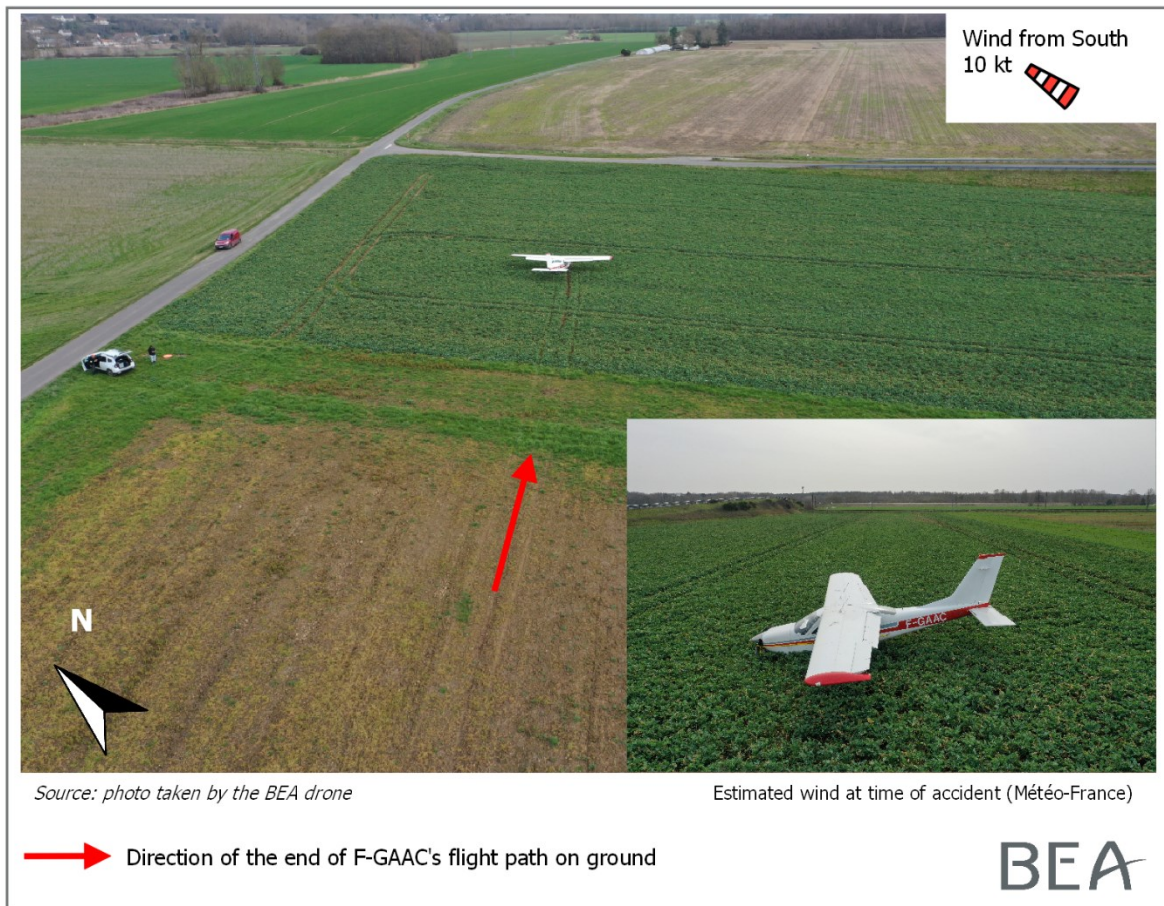


Figure 2: overview of accident site

The aircraft's nose gear had ruptured and one of the two propeller blades was bent, consequences of the forced landing. No other damage was found on the aeroplane. An estimated quantity of 80 to 100 l of fuel was found in the tanks. The integrity of the fuel system up to the engine was checked, as well as the operation of the electric fuel pump.

2.2 Additional examinations carried out

2.2.1 Powerplant bench test

The engine was removed by the workshop responsible for its maintenance and tested on a test bench at the *École Nationale de l'Aviation Civile* (ENAC) in the presence of the BEA. This test did not reveal any malfunctions.

When the workshop responsible for the engine's maintenance removed the engine, they reported that the supply line of the mechanical fuel pump was found slightly loose. The manufacturer was consulted on this matter and confirmed that such a loosening may lead to air bubbles entering the fuel system, which may cause a loss of power. However, according to the manufacturer, this loss of power would be limited and could not lead to an engine shutdown. For safety reasons, an engine test with a loose fuel line was not performed.

The examinations conducted did not reveal any other elements that could explain this power loss.

2.2.2 Quality control of AVGAS 100LL fuel

The analyses confirmed that the fuel used was AVGAS 100LL and that it was not contaminated. Its measured physical-chemical properties met the specifications. The results of the analyses carried out on the fuel sample taken from the tanks of F-GAAC could not explain an engine power loss.

2.3 Aircraft information

The Cessna 177 RG is a metal, single-engine, four-seater aeroplane with a retractable landing gear and a high wing. It is equipped with a 200 hp Lycoming engine.

As standard equipment, the flight manual indicates the presence of shoulder harnesses and specifies that a properly adjusted harness will permit the occupants to have sufficient freedom of movement, while protecting them from hitting surfaces due to sudden forward deceleration movements.

F-GAAC is also equipped with a transponder and an emergency locator transmitter.

2.4 Forced landing manoeuvre

2.4.1 Forced landing procedure without engine power

The “Emergency landing without engine power” procedure of the flight manual lists the following items:

- Adjust and fasten the lap belts and shoulder harnesses.
- Turn auxiliary fuel pump to “ON”.
- Pull mixture control to idle cut-off position.
- Turn fuel selector to “OFF”.
- If the type of selected field permits, extend landing gear.
- Make approach at 85 mph (i.e. 74 kt).
- If electrical power is available, extend flaps as necessary.
- Set master switch to OFF.
- Unlatch cabin doors prior to final approach.

2.4.2 Recommended practices

The aeroplane pilot manual², in the actions to be taken section of the forced landing chapter, indicates that when the engine has shut down, the pilot must comply with the procedure defined in the flight manual. It also specifies that, depending on the seriousness of the situation and as far as possible, the pilot must transmit an emergency message, or even a “Mayday” message, on the frequency of the air traffic unit they are in contact with. If the pilot is in distress and not in contact with any air traffic unit, they must transmit their message on the 121.50 MHz frequency. Also, if the aeroplane is equipped with a transponder, the pilot must squawk the distress code 7700. If the “manual” position is within reach, the pilot must activate the emergency locator transmitter.

Regarding the preparation for landing, the manual indicates that the pilot should expect a marked deceleration on contact with the ground. Before arriving on final, the pilot must unlatch the access or emergency door(s).

² Published by Cepadues. 18th edition of the manual in force at the time of the accident.

2.5 Meteorological information

According to the METAR messages from Châteaudun aerodrome (located 65 km away) and from Tours airport (located 33 km away), the meteorological conditions were as follows:

- at Châteaudun: wind from 170° of 11 kt, CAVOK, temperature +19°C, dew point temperature +9°C, QNH 1027 hPa;
- at Tours: wind from 180° of 11 kt, CAVOK, temperature +19°C, dew point temperature +9°C, QNH 1027 hPa.

According to Météo-France, at the aeroplane's flight altitude at the time of the event, there was a more or less established southerly wind of up to 15 kt.

2.6 Pilot information

On the day of the accident, the 66-year-old pilot held a valid Private Pilot Licence - Aeroplanes with a SEP rating. He had logged 321 aeroplane flight hours, including 276 hours as pilot-in-command and 180 hours on F-GAAC. He had flown 21 hours in the last six months, all on F-GAAC. The pilot was the owner of this aeroplane. He also had gliding experience, having started gliding at the age of 15 and having obtained his certificate the following year. He indicated that while gliding, he had made six or seven landings outside an aerodrome. Although he stopped gliding at the age of 24, from time to time in the last few years, he had flown with friends as a passenger. In this context, his last flight in a glider was in 2020.

2.7 Statements

2.7.1 Pilot statement

The pilot indicated that he had flown a lot in the previous month and that he was very satisfied with his aeroplane. However, the day before the occurrence, on the return leg to Étampes after a local flight of approximately twenty minutes, he felt engine spluttering at the end of the downwind leg. He managed to continue his approach and to perform a normal landing, but he thought it wise to have his aeroplane checked by the maintenance workshop at the aerodrome, which usually carried out maintenance on it. As the examination revealed nothing unusual, he did not cancel the afternoon flight lasting 95 minutes, during which he observed no engine anomalies.

The pilot specified that during the pre-flight inspection the next day, he drained the tanks. This operation did not reveal the presence of water. He indicated that for the first part of the return flight, he chose an altitude allowing him to enjoy the view of the region's châteaux and that he intended to climb to an altitude of 2,500 ft for the end of the flight. Before having the time to do this, he experienced engine spluttering with jolts, but no real vibrations, and specified that he had time to perform a quick troubleshooting, to set the electric pump switch to "ON" and to switch the fuel selector from "BOTH" to LEFT.

Observing that these actions had no effect, the pilot indicated that, given the short time available, he fully focused on his landing procedure and did not have the opportunity prior to landing to unlatch the doors, to transmit a radio message, to squawk the transponder code 7700 or to manually activate the switch of the emergency locator transmitter. He said that according to him, using shoulder harnesses in his aeroplane is only useful in the event of turbulence or when flying in the mountains, and added that he did not use them on the day of the accident.

2.7.2 Passenger statement

The passenger indicated that he felt the engine lose thrust and saw the pilot trying to find the cause of the failure. The pilot then told him that they were going to land. He indicated that the chosen field looked suitable to him, and he was not afraid. He specified that he had flown in gliders a few times about 25 years before. He indicated that he felt well secured by the lap belt but was unaware that the aeroplane was also equipped with a shoulder harness. He did not suffer any injuries and considered that he had not needed the shoulder harness.

2.8 Choosing the en route altitude

In its “En route” section, para. 1.1 “General Rules”, the AIP France regulation indicates the following: “*WARNING: Most high speed low altitude military flights are carried out on French territory below 1,500 ft ASFC³ (450 m) from Monday to Friday (except on public holidays), from SR⁴-30 to SS⁵+30. Therefore, VFR pilots are advised to cruise above 1500 ft ASFC whenever possible and allowed.*” This recommendation is indicated in a box included in the key on aeronautical charts of scale 1:500,000 published by the Aeronautical Information Service (AIS).

Furthermore, a study by the European Aviation Safety Agency (EASA) on bird strike occurrences between 1999 and 2008⁶, showed that 95% of strikes occurred at heights below 2,500 ft. Following the accident in 2021⁷, the French Aeronautical Federation (FFA) issued a recommendation to fly at an en route height of more than 2,500 ft.

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.

Scenario

During the return leg of a pleasure flight, while the pilot was flying at low altitude and reduced speed along the north bank of the river Loire, the engine of the Cessna C177 lost power for a reason that the investigation was unable to determine. The low height and reduced speed of the aeroplane at the time of the engine failure limited the pilot’s choice of flight paths as well as his resources. After a quick and unsuccessful troubleshooting procedure, the pilot managed to adopt a roughly straight path to carry out a forced landing in a field.

During the landing run, the change in the type of soil caused the nose gear to collapse. The residual power at that time was sufficient to cause an injury to the pilot who had not fastened his shoulder harness.

Contributing factors

The lack of knowledge of the usefulness of fastening the shoulder harness in addition to the lap belt may have contributed to increasing the risks of bodily injuries to the pilot and his passenger.

³ Above Surface.

⁴ SunRise.

⁵ SunSet.

⁶ [Bird population trends and their impact on Aviation safety 1999-2008.](#)

⁷ [Accident to the Robin DR400 registered F-GNNE on 18 April 2021 at Saint-Pathus.](#)

Safety lessons

Choice of flight height and speed

On a single-engine aeroplane, in a power loss situation, pilots have to manage an energy. The latter directly impacts the amount of time that the pilot will have before landing. Maintaining control of the path remains a priority. As a consequence, the pilot must manage their workload and possibly postpone or not perform some actions.

It therefore seems that choosing a sufficiently high en route altitude – when this is possible depending on meteorological conditions and airspace – gives pilots more time to fully manage an engine failure and also reduces the likelihood of a conflict with a military aeroplane or bird (see para. 2.8). Choosing a reduced speed en route is another reason for preferring a higher altitude.

Use of seat belts

Wearing the shoulder harness in addition to the lap belt, as specified in some flight manuals, provides body restraint for the occupants of both front seats. By considerably reducing the risk of contact with the instrument panel, sunshield and wheel in the event of a violent forward impact, the systematic use of shoulder harnesses by pilots and front-seat passengers contributes to limiting the number and severity of injuries.

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