BEA
Bureau d'Enquêtes et d'Analyses
pour la sécurité de l'aviation civile
www.bea.aero
@BEA_Aero

INVESTIGATION REPORT

Accident to the MORANE SAULNIER - MS880 registered F-GITN

on 23 March 2019
at Taisnières-sur-Hon (Nord)

Time	Approximately 16:30[1]
Operator	Private
Type of flight	Cross-country
Persons on board	Pilot and one passenger
Consequences and damage	Pilot and passenger slightly injured, aircraft severely damaged

This is a courtesy translation by the BEA of the Final Report on the Safety Investigation published in February 2020. As accurate as the translation may be, the original text in French is the work of reference.

[1] Unless otherwise stated, all times given in this report are in local time.

Engine failure after an engine failure exercise, forced landing without power

1 - HISTORY OF THE FLIGHT

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

The pilot was carrying out a round-trip flight from Maubeuge Elesmes aerodrome (Nord) to Valenciennes Denain aerodrome (Nord) as training for his SEP[2] rating revalidation proficiency check. A passenger, who was the aircraft owner, accompanied him. During the return trip to Maubeuge, the pilot performed some handling exercises. These included flight at low airspeed for a few minutes and then a simulated forced landing without power. He reduced the engine power, then activated the carburetor heat, and proceeded to the chosen area. He performed a go-around while flying over the trees before the field, climbed and turned left towards Maubeuge. He thought he had deactivated the carburetor heat during the go-around. On reaching approximately 1100 ft, the engine misfired a few times and then stopped. The pilot then reduced the pitch, used the starter, switched the fuel selector to the opposite tank and checked that the fuel pump was running, but the engine did not restart. At this point, the aircraft was at the end of the downwind leg in relation to the field he had chosen for the previous exercise, and he therefore turned onto the base leg. During the descent, the passenger made three unsuccessful attempts to restart the engine. The pilot performed a low speed approach to shorten the landing distance and to prevent the aircraft from turning over when the nose landing gear touched the ground. The pilot specified that the leading edge slats[3] were extended and he thought the flaps were also extended at 30°. The landing was hard, the landing gear broke and the plane came to a stop in 15 m.

[2] Single Engine Piston.

[3] The MS880 has automatic leading edge slats that open approximately 15 to 20 kt before the stall speed to provide both increased lift and a warning of an increase in the angle of attack.

RÉPUBLIQUE FRANÇAISE
Liberté
Égalité
Fraternité

BEA2019-0121.en/**May 2020**

2 - ADDITIONAL INFORMATION

2.1 Aircraft occupant information

The pilot held a valid private pilot licence for aeroplanes with an SEP rating. He had logged more than 500 flight hours, including about 50 hours on type.

The aircraft owner in the right front seat was also a pilot, who mainly flew his MS880. He did not hold an instructor rating.

2.2 Pilot's statement

The pilot explained that he had selected a low speed on final to minimise the run distance and to ensure the nose landing gear did not touch the ground too early in order to prevent the aircraft from turning over. In his opinion, the landing would have been less hard if he had had a higher airspeed. He specified that the ground was soft because of rain in the preceding days, and that during the landing, the landing gear sunk into the soil and then broke.

2.3 Engine examination

The aircraft had a Teledyne Continental Motors 0.200.A engine. The examination at the accident site ruled out the hypothesis of fuel exhaustion.

Apart from damage to the spark plug power cables, subsequent workshop examinations of the engine did not find any anomalies. Comparison of the photographs of the engine at the accident site with those taken on arriving at the BEA shows that some of the damage observed probably occurred during the transportation and handling of the engine. This damage would only affect engine operation if magneto 1 was off, which was not the case according to the statements.

2.4 Meteorological conditions

The pilot estimated that the cloud ceiling was about 2,500 ft and visibility was about 3,000 to 4,000 m. The available METAR reports from the nearest airports (Lille Lesquin at 60 km, Albert Bray at 90 km and Charleroi at 46 km) indicated temperatures of 10 to 11°C and a dew point of 6 to 8°C.

2.5 Icing conditions

The European Union Aviation Safety Agency (EASA) has published a document entitled ''*Piston engine icing*''[4], which describes the different types of icing that can occur in the carburetors of piston engines. It specifies the contributing factors, the meteorological conditions likely to cause it, the parameters that the pilot can use to identify the onset of icing and the actions to be taken to avoid or clear it.

The document published by EASA includes a diagram indicating the severity of icing that can occur in the carburetor as a function of the external temperature and the dew point temperature. This diagram is intended to be general, to cover all carburetors associated with piston engines on aircraft. It is reasonable to assume that these values may differ depending on the engine installation under consideration.

[4] Document available at the following address: https://www.easa.europa.eu/document-library/general-publications/egast-leaflet-ga-5-piston-engine-icing.

Other authorities dealing with aviation safety also publish diagrams of this type (United States, Canada, Australia).

For the type of propulsion system on the F-GITN, the EASA document states:

- that the onset of icing in the engine carburetor results in a drop in engine speed;
- that after the onset of icing, if the hot air source is selected to clear it, it can take more than 15 seconds for the engine to return to normal power;
- that the temperature and humidity conditions known at the time of the accident are on the boundary between the following two icing envelopes:
- an envelope characterised by a risk of severe carburetor icing regardless of the power;
- an envelope characterised by a risk of moderate carburetor icing taking into account usual power for cruise flight/a risk of severe carburetor icing taking into account usual power for descent.

3 - CONCLUSIONS

The conclusions are established solely on the basis of the information that came to the knowledge of the BEA during the investigation. They are not intended to apportion blame or liabilities.

Scenario

After a low airspeed exercise, the pilot performed an engine failure exercise, carrying out a go-around when he arrived above the field. During the climb, the engine stopped. The pilot was unable to restart it and made a forced landing in a freshly ploughed field. The landing gear penetrated deep into the soil causing it to break. The plane then slid for a few metres, with the landing gear broken.

The examination of the engine did not find any anomalies that might have caused it to shut down. Given the meteorological conditions and the lack of precise information about the use of the carburetor heat system, the hypothesis of carburetor icing causing the loss of engine power cannot be ruled out.

Safety lessons

When conducting exercises, such as a simulated forced landing without power, the pilot's workload is high and he may overlook the risks that some exercises present. The presence of an instructor, in addition to his pedagogical contribution, would mean that the safety of the flight could be monitored and exercises prepared and carried out in the best possible conditions.