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SAFETY INVESTIGATION REPORT

Accident to the ROBIN DR400-160 registered F-GABZ on 23 October 2023 on Saint-Quentin - Roupy aerodrome

Time	Around 15:15[1]
Operator	Aéroclub de l'Aisne
Type of flight	Introductory flight
Persons on board	Pilot and two passengers
Consequences and damage	Aeroplane substantially damaged, one passenger slightly injured
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.	

Runway overrun on take-off in the scope of an introductory flight

1 HISTORY OF THE FLIGHT

Note: the following information is principally based on statements and the examination of the site.

The Aéroclub de l'Aisne organised three introductory flights for an association. These three flights were planned for the same day and were to be carried out in succession.

The pilot arrived at Saint-Quentin - Roupy aerodrome shortly after 13:40. He carried out the pre-flight inspection before the arrival of the passengers. The latter arrived at the flying club at 14:30. The first flight, with three passengers, started at 14:45 from runway 14 and lasted for around 15 min. This flight was followed by a second flight with three passengers, a quarter of an hour later.

As the wind had changed direction, the pilot decided to take off from runway 04 for the third flight. He left the apron of Saint-Quentin - Roupy aerodrome at around 15:15 with two passengers. The pilot lined up at the threshold of runway 04 and applied full power. He indicated that during the take-off run, he took the weight off the nose wheel to help the aeroplane accelerate. According to the pilot, the initial speed increase was normal. Halfway along the runway, he started rotating at a speed of around 90 km/h. The aeroplane did not take off. Expecting the aeroplane to accelerate, the pilot held the pitch-up attitude. The aeroplane ran off the runway and reached a country road. The road, higher than the runway, caused the aeroplane to leave the ground. The aeroplane stayed airborne over a distance of around 40 m before touching down hard on the ground. The aeroplane came to a stop in a field.

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

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2 ADDITIONAL INFORMATION

2.1 Examination of site and wreckage

The wreckage was located in a field at around 90 m from the end of runway 04.

Run marks visible in the grass and at the edge of the country road situated at the end of the runway showed that the aeroplane had not left the ground when it ran off the runway (see **Figure 2**). At around 40 m on the other side of the road, marks were also visible in the crop and showed that the aeroplane had run on its main landing gear on a heading of 30°.

The nose gear, the RH main landing gear, the propeller and the RH wing were damaged.

The examinations carried out by the BEA did not find any fault in the flight controls. The engine rotated freely and the ignition connections were functional. The flaps were found retracted (clean position) on the wreckage. The retraction of the flaps was not caused by the vibrations arising from the collision with the ground.

Figure 1: aerial view of the site and the wreckage (Source: BEA)

Figure 2: run marks at the end of the runway (Source: BEA)

2.2 Aerodrome information

Saint-Quentin - Roupy aerodrome has two grass intersecting runways 04/22 and 14/32 measuring 670 m and 620 m long respectively and 100 m wide. The take-off distance on runway 04 is however restricted to 546 m by a NOTAM. This limitation is due to the presence of the country road passing a few metres from the end of runway 04.

2.3 Meteorological information

The 15:00 METAR for Albert-Bray aerodrome situated at around 22 NM from Saint-Quentin - Roupy aerodrome indicated wind from 120° of 11 kt, visibility greater than 10 km and rain.

The 15:30 METAR mentioned wind from 090° of 6 kt, visibility greater than 7 km (temporarily less than 4 km) and rain.

At the time of the accident, the Saint-Quentin weather station recorded a mean wind direction of 100° with a mean speed of 8 kt. There was light, continuous rain. Around 2 mm had fallen in the 30 min preceding the accident. Prior to this rain, the last precipitations had been the night of 21 to 22 October when 1.4 mm had fallen.

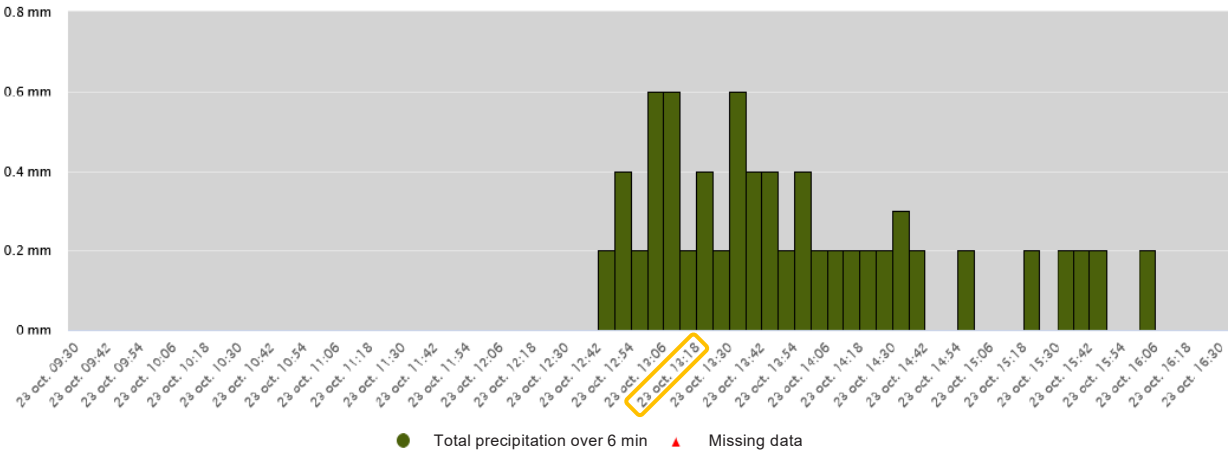

Figure 3: total precipitation at Saint-Quentin, 23 October from 09:30 UTC to 16:30 UTC (Source: Météo-France. Two hours should be added to obtain the local time.)

2.4 Pilot's experience and statement

The 69-year-old pilot held a CPL. He had logged 12,300 flight hours including 109 hours in the previous 3 months and 27 hours in the 30 days preceding the accident. He had totalled 32 flight hours on the DR400 in the previous 3 months, including 7 hours in the 30 days preceding the accident.

The pilot regularly carried out parachute drop campaigns and was an instructor at the Aéroclub de l'Aisne.

The day of the accident, on his arrival at the flying club, the pilot acquainted himself with the weather conditions by means of the Albert-Bray aerodrome METAR. In the flight preparation room, a television continuously displays the latest SIGWX charts published by Météo-France. The pilot did not complete a weight and balance sheet nor did he calculate the take-off performance. He carried out the pre-flight inspection of F-GABZ and then carried out the first two flights without incident.

For the third flight, the pilot indicated that he did not carry out a before take-off briefing and did not mention having performed the checklist. He lined up and then applied full power. During the take-off run, the aeroplane appeared to him to be accelerating normally. The pilot indicated that he took the weight off the nose wheel to help the aeroplane gain speed. After rotating, the pilot expected the aeroplane to accelerate as it had done for the two previous flights.

Once the aeroplane had come to a stop in the field, the pilot indicated that he set the mixture control to idle cut-off, switched off the magnetos and then evacuated the aeroplane with his passengers. He could not remember if he retracted the flaps before the evacuation.

The pilot added that he taught his students to reject the take-off if the aeroplane had not reached a sufficient speed mid-runway[2] for the take-off from Saint-Quentin - Roupy (base). He mentioned that for the accident flight, the aeroplane seemed to be accelerating normally. He added that mid-runway, the speed was slightly below the rotation speed indicated in the flight manual.

2.5 Aircraft information

2.5.1 General characteristics of F-GABZ

F-GABZ is a DR 400-160. It is a four-seater aeroplane with tricycle landing gear powered by a 160 hp Lycoming O-320-D2A engine. The 2,000-hour engine inspection had been carried out three months before the accident. It had included a complete engine rebuild. Since this overhaul, no power plant failures had been reported.

F-GABZ has an empty weight of 610 kg and a maximum take-off weight of 1,050 kg.

2.5.2 Take-off speeds

The DR400-160 flight manual indicates that the rotation must be carried out at 100 km/h with the flaps in the first detent and that this must be followed by level acceleration. It is then recommended to start climbing at a speed of 125 km/h.

2.5.3 Take-off performance at time of accident

The take-off weight at the time of the accident was estimated at 931 kg for a moment arm of 0.43 m. These values were within the weight and balance envelope fixed by the flight manual.

According to the flight manual, with the flaps in the take-off position and a rotation carried out at 100 km/h, the required take-off distance[3] on a grass runway is around 600 m with a required run distance[4] of around 340 m on a grass runway. It is not possible to calculate the take-off performance with the flaps retracted with the DR400-160 flight manual.

[2] In the article "*Attention aux pistes boueuses*" by Michel Barry, published in the French Aeronautical Federation (FFA) magazine, Info Pilote, No 697 of April 2014, the author mentions this procedure and discusses the risks associated with a take-off from a soft runway.

[3] Total distance from stop to passing through a height of 15 m at a speed of 1.3 times the stall speed.

[4] Run length required to reach 1.1 times the stall speed.

2.6 Information relating to procedure of taking weight off the nose wheel during take-off

The pilot indicated that he took the weight off the nose wheel during the take-off to help the aeroplane accelerate.

When taking off from a soft runway, taking the weight off the nose wheel during the take-off run and adopting a pitch attitude for the best acceleration are recommended practices in the ENAC VFR Instructor Guide.

However, in Section 4.7 of the DR400-160 flight manual, Normal Procedure - Take-off, it is indicated that it is advisable not to take the weight off the nose wheel to facilitate holding the centreline. The flight manual does not mention any particular procedure for taking off from a soft runway.

2.7 Introductory flight information

The introductory flights were programmed by the flying club and the association. These flights were for passengers who were not members of the flying club. They were carried out for remuneration and the profits went to the flying club. From an operational point of view, according to the regulations, introductory flights are local flights lasting a maximum of 30 minutes and during which the aeroplane remains within a 40 km radius from its departure aerodrome. Pilots on such flights must have logged a minimum of 200 flight hours since obtaining their licence for the category of aircraft concerned by the introductory flights, and must have flown at least 25 hours in the previous 12 months. Lastly, a safety risk assessment must be carried out by the flying club and documents detailing the procedures and conditions for carrying out such flights must be drawn up. The FFA[5] and the DGAC[6] have published several documents for flying clubs and pilots to inform them about and help them take into account the specificities of these flights.

This topic has also been discussed in the thematic review of published reports in 2021, available on the BEA's website.

3 CONCLUSIONS

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

Scenario

After carrying out two introductory flights from runway 14, the pilot undertook a third introductory flight, with two passengers on board, taking off from runway 04. The required take-off distance on an unpaved runway with the flaps in the take-off configuration was approximately 600 m.

[5] In agreement with the FFA, documents concerning introductory flights "*Fiche pratique – Vols de découverte*", introductory flight safety "*Fiche pratique – Sécurité des vols de découverte*" and generic information about the introductory flight activity and risk assessment "*Document Générique sur l'activité et l'évaluation des risques en matière de sécurité en vols de découverte*" are available in the media library of the page dedicated to this safety investigation.

[6] *Guide pour les exploitations d'aéronefs autres que les aéronefs motorisés complexes à des fins non commerciales*, see page 22 and onwards. In agreement with the DGAC, section 5.3 of the guide concerning introductory flights is available in the media library of the page dedicated to this safety investigation.

Two factors probably degraded the aeroplane's take-off performance:

- the wet grass runway[7] following a shower shortly before take-off;
- the probably retracted flaps (clean configuration).

The pilot anticipated the rotation, which also increased the required take-off distance. The aeroplane ran off the end of the runway and then left the ground on crossing a raised road situated at the end of the runway. The aeroplane did not have sufficient speed to climb and fell back down around 40 m further on.

Contributing factors

The following factors may have contributed to the runway overrun:

- the decision to use runway 04 for take-off, in the conditions of the day, in view of the aeroplane's performance on a wet grass runway;
- the failure to complete the before take-off checklist, which may have contributed to the pilot not detecting the probable incorrect flap configuration for take-off.

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

[7] In agreement with the FFA, the article about the impossibility of taking off from a muddy runway, "*L'impossibilité de décoller sur une piste boueuse*" published in Info Pilote No 814 of January 2024, is available in the media library of the page dedicated to this safety investigation.