

Accident to the Robin DR400-120
registered **F-HGUY**
on 3 April 2016
at Rennes Saint-Jacques (Ille-et-Vilaine)

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

Time	Around 11:20 ⁽¹⁾
Operator	Rennes Ille et Vilaine aero-club
Type of flight	Training
Persons on board	Student pilot
Consequences and damage	Aeroplane damaged

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

Hard landing, collapse of landing gear in solo training flight

1 - HISTORY OF THE FLIGHT

Note: The following information is principally based on statements.

The solo student pilot took off from runway 10 to perform runway circuits with the authorization of the club's instructor. In the left-hand downwind leg, he configured the aeroplane with the flaps set to the take-off position. On final approach, after correcting the approach slope at an estimated altitude of 700 ft, the pilot said that the aeroplane was stabilized with a speed of 140 km/h. The wind reported by the controller was 140° at 11 kt. At wheel touchdown, centred on the runway axis, with reduced power, the pilot felt normal contact with the runway. He added that the aeroplane bounced. On making contact with the runway again, the nose landing gear bent under the fuselage and then the main landing gear failed, piercing the wings. The aeroplane slid and came to a halt on the runway at approximately 300 m from the touchdown zone markings of runway 10.



Source: BGTA

⁽²⁾In accordance with the conditions required to issue a Basic Pilot Licence for aeroplanes (paragraph 4.6.1.1. of the decree of 31 July 1981 regarding civil aviation non-professional crew licences and ratings).

2 - ADDITIONAL INFORMATION

2.1 Pilot information

The student pilot had logged 74 flight hours of which 9 in the previous 30 days. He said that he had started carrying out introductory flights in February 2013 and that he had started his training in April 2014. He explained that he wanted to sit the practical flight test of the Basic Pilot Licence for aeroplanes before the end of the validity of his theoretical examination for the Private Pilot Licence (aeroplane) (PPL(A)) which expired on 7 April 2016, i.e. four days after the accident. However, he needed to log around another 40 minutes of flight time as a solo pilot⁽²⁾ before sitting the practical test.

The pilot said that he chose to land with the flaps set to the take-off position because of the wind and turbulence conditions. He had also noted that an increase in the wind strength and a crosswind component had been forecast in the hours following his flight. He added that it was difficult for him to estimate the amplitude and height of the bounce. Nevertheless, he considered that he had had the impression of a small bounce, normal (not hard) contact with the runway, and on the runway axis. He explained that during the flight, he was attentive to wind and turbulence and that he had difficulties in interpreting the wind information provided by the controller on final approach, except perhaps that concerning the strength. He reported that he had never bounced during his training and that he was not prepared for aborting the landing. He said that for him, the flare was a personal perception, without a formal reference frame, all the more so for runway 10 with an upward slope.

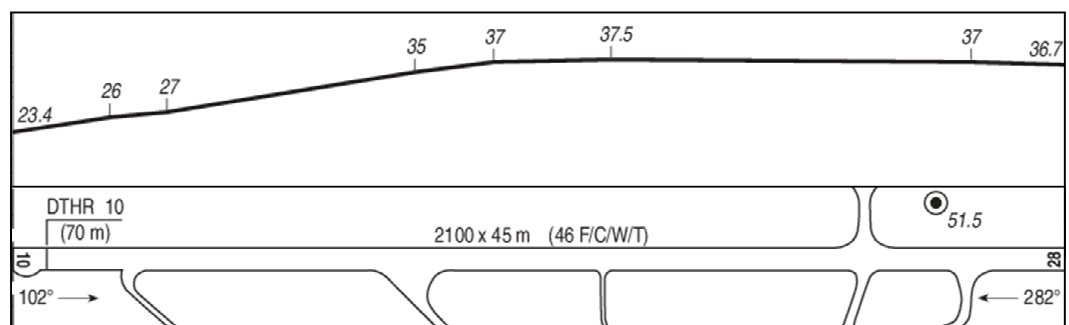
2.2 Aerodrome Information

Rennes Saint-Jacques aerodrome has two paved runways and one grass runway. Runway 10/28 is 2,100 m long and 45 m wide. The landing distance available (LDA) on runway 10 is 2,030 m (presence of a displaced threshold). A PAPI⁽³⁾ with a 3.0° approach slope is located on the left side of runway 10.

From the displaced threshold of runway 10, the runway has an upward slope. After the touchdown zone markings and over a distance of 500 m⁽⁴⁾, the average slope of runway 10 is approximately 1.6 %.

⁽³⁾Precision Approach Path Indicator.

⁽⁴⁾Distance greater than the aeroplane's landing distance in the conditions of the day and with the maximum landing weight.



Source: AIP France

Aerodrome obstacle chart (Altitudes in metres)

2.3 Meteorological information

The wind recorded at 11:05 by the Rennes Saint-Jacques aerodrome station was 110-140° at 10 kt, maximum 14 kt. The aerodrome TAF forecast rain showers between 11:00 and 14:00. At 11:12, when F-HGUY was at the holding point before taking off from runway 10, the tower controller reported wind from 130° at 10 kt to the pilot. At 11:17, the controller cleared the pilot for an option and told him that the wind was 140° at 11 kt.

Based on these recordings, the estimated maximum crosswind component during the final approach was 7 kt.

2.4 Aircraft information

According to the aeroplane's flight manual, the aeroplane's maximum take-off and landing weight is 900 kg. Its take-off speed is 100 km/h. At the aeroplane's maximum weight, reduced power and with wings level, the stall speeds (V_s) with the flaps set to the take-off position and to the landing position are respectively 88 and 83 km/h.

The manual's "Normal procedures" section indicates a speed of 110 km/h (to be adjusted according to the wind) for a final approach with the flaps set to the landing position. A landing in crosswind or strong wind gust conditions is performed with flaps set to the take-off position and an approach speed of 130 km/h increased by half the wind gust speed.

Note: The stall speed values increased by 30% lead to the following standard approach speeds (1.3 V_s) without a wind correction: 115 km/h for flaps set to the take-off position and 108 km/h for flaps set to the landing position.

2.5 Flare information

2.5.1 Number of accidents in landing phase

During the period 2009-2019, the number of accidents which occurred in the landing phase (excluding forced or precautionary landings) represents half the accidents which occurred in France to aeroplanes with a certified maximum take-off weight of less than 2.25 t⁽⁵⁾.

2.5.2 Specificities of flare

The flare is the landing phase which consists in ensuring the aeroplane's transition from the final approach path to touchdown. The associated piloting technique depends on the conditions of the day (characteristics of aeroplane, influence of wind, turbulence, runway, obstacles, etc.) together with the way in which the path before touchdown is defined and the pilot's command of this technique and the associated training.

During the flare, the slope, pitch attitude and speed (and also the angle of attack) change rapidly in a short period. Consequently, as described in numerous books, the variation in the nose-up attitude to flare from the aiming point to touchdown must be based on the acquisition of visual scanning skills. Visual references depend, in particular, on the touchdown point chosen, the characteristics of the aeroplane (forward visibility according to the engine cowling for example) and the environment (aerodrome, runway, horizon, meteorological conditions, etc.). It is, however, generally accepted that the pilot should look sufficiently far ahead during the flare to also facilitate keeping the wings level and staying on the runway centreline.

⁽⁵⁾ 367 accidents (of which 1.4% led to fatal injuries) out of 726 accidents (of which 10.7% led to fatal injuries).

When landing on a runway with an upward slope, the visual references are different and may disconcert the pilot. The nose-up input is greater than on a horizontal runway which as a consequence, modifies the aeroplane's pitch attitude and the duration of the flare according to stick inputs.

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

The final approach was carried out with the flaps set to the take-off position and with an increased speed. This increase in speed by the pilot (140 km/h) to take into account the crosswind component was excessive with respect to the actual wind conditions (a maximum crosswind of 7 kt and headwind of 9 kt). Even if the excessive speed contributed to the bounce, starting the flare too high because of the different visual references linked to an upward sloping runway could also have been the cause. When the aeroplane regained height after this bounce, the pilot may have made nose-down inputs to land. It is also possible that the aeroplane stalled. The contact of the nose and then main landing gear with the runway, greater than the structural limits, led to them collapsing.

Contributing factors

The following factors may have contributed to the hard landing and the failure of the landing gear:

- Management of the final approach in the presence of apprehension linked to the wind forecasts, in a flight context where there was time pressure in order to be able to sit the practical test of the basic pilot licence for aeroplanes.
- An excessive increase in speed on final approach.
- Management of the flare which depends on numerous factors.