

Technical report

ULM A-006/2023

Accident involving an EVEKTOR EV97 EUROSTAR aircraft, registration EC-EQ7, on 23 March 2023 at San Torcuato Aerodrome (La Rioja).

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Notice

This report is a technical document that reflects the point of view of the Civil Aviation Accident and Incident Investigation Commission regarding the circumstances of the accident that is the object of the investigation, its probable causes, and its consequences.

In accordance with the provisions of Article 5.4.1 of Annex 13 of the International Civil Aviation Convention, Article 5.6 of Regulation (EU) No 996/2010 of the European Parliament and of the Council of 20 October 2010; Article 15 of Law 21/2003 on Air Safety; and Articles 1 and 21.2 of RD 389/1998, this investigation is exclusively of a technical nature, and its objective is the prevention of future aviation accidents and incidents by issuing, if necessary, safety recommendations to prevent their recurrence. The investigation is not intended to attribute any blame or liability, nor to prejudge any decisions that may be taken by the judicial authorities. Therefore, and according to the laws specified above, the investigation was carried out using procedures not necessarily subject to the guarantees and rights by which evidence should be governed in a judicial process.

As a result, the use of this report for any purpose other than the prevention of future accidents may lead to erroneous conclusions or interpretations.

This report was originally issued in Spanish. This English translation is provided for information purposes only.

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Abbreviations

| | |
|-------|-------------------------------|
| °C | Degrees Celsius |
| AEMET | State Meteorological Agency |
| CV | Horsepower |
| h | Hours |
| kg | Kilograms |
| km | Kilometres |
| Km/h | Kilometres per hour |
| LT | Local time |
| m | Metres |
| MAF | Multi-axis fixed-wing |
| MHz | Megahertz |
| min | Minutes |
| N | North |
| rpm | Revolutions per minute |
| ULM | Ultralight motorised aircraft |
| VFR | Visual flight rules |
| W | West |

Synopsis

| | |
|---------------------------------------|---|
| Operator: | Private |
| Aircraft: | EVEKTOR EV97 EUROSTAR, registration EQ7 |
| Date and time of the accident: | 23/March/2023, 11:35 LT ¹ |
| Site of the accident: | San Torcuato Aerodrome (La Rioja) |
| Persons on board: | 1, unharmed |
| Type of flight: | General aviation - Private |
| Flight rules: | VFR |
| Phase of flight: | Landing - landing rollout |
| Date of approval: | 29-November-2023 |

Summary of the incident:

On Thursday, 23 March 2023, the EVEKTOR EV97 EUROSTAR aircraft with registration number EC-EQ7, suffered an accident while landing on runway 17 at San Torcuato Aerodrome (La Rioja).

The aircraft had taken off for a local round-trip flight with only the pilot on board.

After approximately thirty-five minutes of flight, during the landing and after touching down on the runway surface, the aircraft performed a curvilinear taxiing trajectory deviating to the left of the centreline until it left the runway and hit a grove of trees, resulting in damage to one of its propeller blades and to the wings.

The pilot was unhurt, but the aircraft sustained significant damage.

The investigation has concluded that the accident was caused by a failure to perform the landing manoeuvre correctly, which led to the loss of control of the aircraft and subsequent runway excursion.

¹ Unless specified otherwise, all times in this report are local. On the day of the accident, local time was equivalent to UTC+1 hours.

1. FACTUAL INFORMATION

1.1. History of the flight

On Thursday, 23 March 2023, the EVEKTOR EV97 EUROSTAR aircraft, registration EC-EQ7, had taken off from San Torcuato aerodrome for a local flight with a planned landing at the same aerodrome and with the pilot as the only occupant on board.

Earlier that day, at 9:00 h, the aircraft had made a first flight lasting 30 minutes without any issues.

After 35 minutes of flight, which passed without incident, the pilot returned to the aerodrome and flew the appropriate circuit to land on runway 17.

According to several witnesses and the pilot himself, the aircraft touched down approximately 12 m past the runway markings and 3 m to the left of the centreline, therefore doing so correctly and at the right speed.

The pilot stated that he gently applied the brakes immediately after touchdown in order to shorten the landing rollout and minimise the length of the subsequent taxi back to the hangar.

When this didn't appear to have any effect, he applied the brakes again after a few seconds, but to no avail.

As the aircraft was travelling on a slight but continuous curved trajectory to the left, the pilot attempted to correct its path by turning to the right, trying to bring it parallel to the runway centreline. However, he stated that the controls were unresponsive, and the aircraft eventually crashed into the vegetation to the east of the aerodrome.

The pilot was unhurt, but the aircraft sustained significant damage.

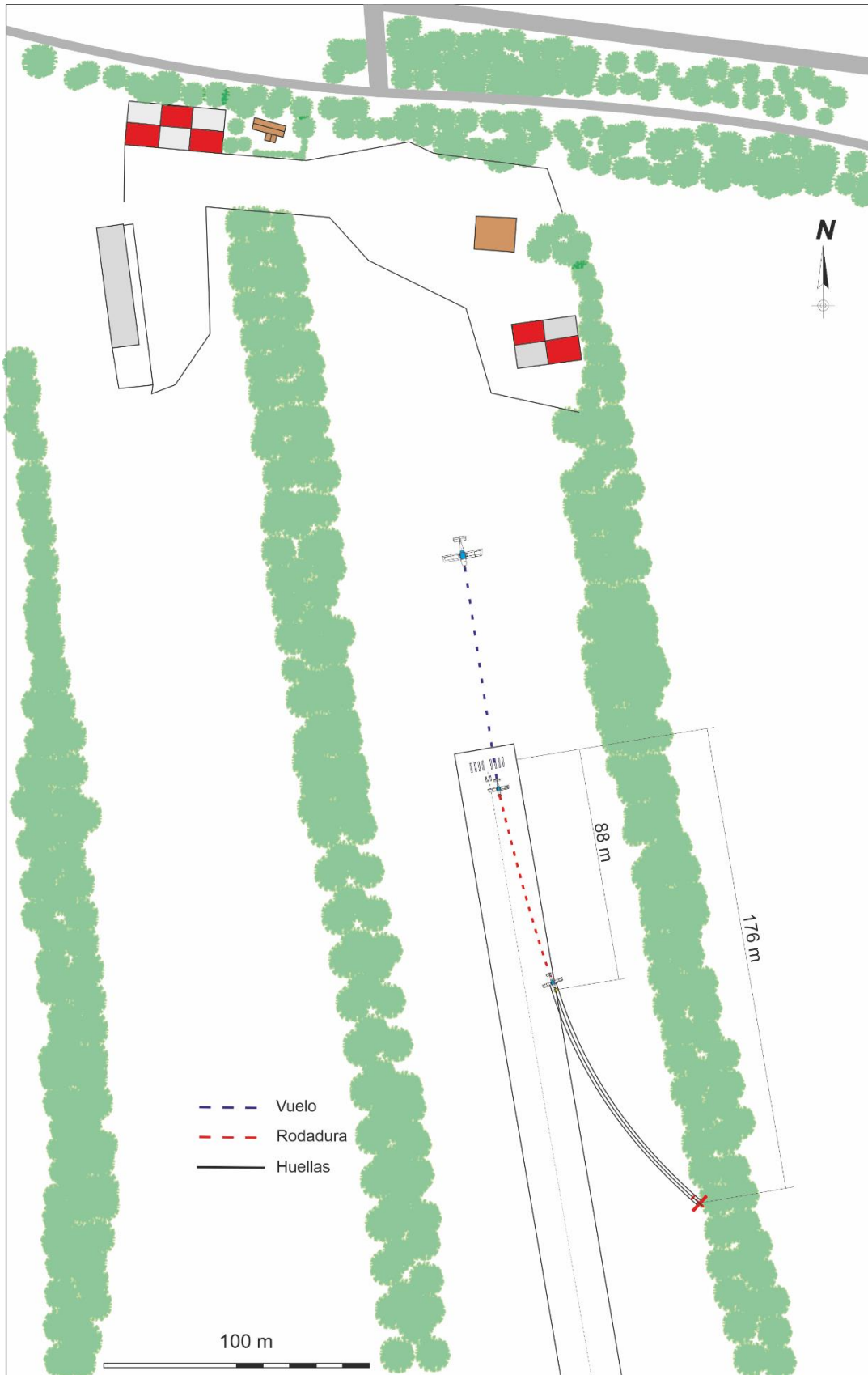


Fig. no. 1 - Diagram of the aircraft's trajectory and final position

1.2. Injuries to persons

| <i>Injuries</i> | <i>Crew</i> | <i>Passengers</i> | <i>Total in the aircraft</i> | <i>Others</i> |
|-----------------|-------------|-------------------|------------------------------|---------------|
| Fatalities | | | | |
| Serious | | | | |
| Minor | | | | |
| Unharmmed | 1 | | 1 | |
| TOTAL | 1 | | 1 | |

1.3. Damage to the aircraft

The aircraft sustained significant damage.

1.4. Other damages

N/A.

1.5. Information about the personnel

1.5.1. Information about the aircraft crew

The 65-year-old pilot had an Ultralight Pilot Certificate and Licence issued by Spain's National Aviation Safety Agency on 22 June 2022, with a Multi-Axis Fixed Wing (MAF) rating valid until 31 July 2024. He also had a Class 1 medical certificate, valid until 24 May 2023.

The pilot had previous flight experience in the flight area and at the aerodrome, having flown the same aircraft on eight previous occasions. On none of these occasions did he have any problems.

He had 829 h of flight experience, of which 126 h were in ULM and 4 h 48 min were in type.

1.6. Information about the aircraft

The aircraft was an EVEKTOR AEROTECHNIK A.S motorised ultralight, model EV-97 EUROSTAR, with a maximum take-off weight of 450 kg. The accident aircraft's serial number is 2005/2618. It has a ROTAX 912 ULS 100 CV engine.

It had a Special Restricted Certificate of Airworthiness issued by the General Directorate of Civil Aviation and valid until 5 July 2006.

According to the aircraft's flight manual, on a grass runway at 2000 ft altitude, its landing rollout is 217 m.

According to the information provided by the club to which the aircraft belonged, due to a change of ownership, it underwent a general overhaul of its airframe and the 200 h engine inspection on 1 July 2022, when it had 1056:30 h of flight time.

At the time of the accident, the aircraft had 1140 h of flight time.

1.7. Meteorological information

According to the information provided by the State Meteorological Agency (AEMET), there are no observation instruments at the accident site. The most representative meteorological stations for that location are the ones at Labastida, Nájera and Cenicero, located 14 km to the northeast, 13 km to the southeast and 18 km to the east, respectively.

The data recorded shows no precipitation, temperatures between 16 °C and 17 °C, and winds from different directions depending on the station, with speeds of around 5 km/h and maximum gusts of 10 km/h.

According to the information collected from eyewitnesses, the conditions were calm at the time of the accident.

1.8. Aids to navigation

N/A.

1.9. Communications

N/A

1.10. Information about the aerodrome

The aerodrome is in the municipality of San Torcuato, 11 km to the south of Haro in La Rioja.

Its coordinates are N 42° 28.45, W 002° 52.18.

It has a grass runway measuring 420 m long by 15 m wide, with the designation 17/35.

The runway is contained within a 700 m long by 90 m wide grass plot with compacted and levelled ground.

The flight information frequency for the area is 129.975 Mhz.

The aerodrome's altitude is 2133 ft/650 m.

1.11. Flight recorders

The aircraft was not equipped with a conventional flight data recorder or a cockpit voice recorder. The applicable aeronautical regulations do not require the installation of any type of recorder on this type of aircraft.

1.12. Aircraft wreckage and impact information

The accident took place during the landing on runway 17 at San Torcuato Aerodrome.

The wreckage was concentrated in one place, in the grove of trees that separates the airfield plot from the adjacent plot to the east.



Fig. no. 2 - Aircraft in its final position

The damaged aircraft remained supported on its landing gear.

One of the three propeller blades was broken and there were scratches on the tip of one of the others. In addition, there was damage to the tips of both wings, to the leading edge of the left wing and the horizontal stabiliser on the tail empennage.

The tracks on the ground were distributed, with varying intensity, over a distance of 88 m beyond the runway, between the point where the aircraft crossed over the left edge of the runway and the point where it came to a standstill. They consisted of three parallel lines curving slightly to the left in the direction of travel on the runway.

The vegetation in the area where the aircraft came to a stop displayed broken and torn branches.

Inside the cockpit, the throttle was not in the idle position, and the tachometer read 2700/2800 rpm.

The tyres on the landing gear wheels were in good condition with no signs of abrasion or wear.

The aircraft was towed from the accident site to the hangar using a strap attached to its nose leg. The brakes were tested en route, both individually (right and left) and as a whole, and it was confirmed that they were working correctly. The wreckage was preserved for a subsequent, more detailed inspection.

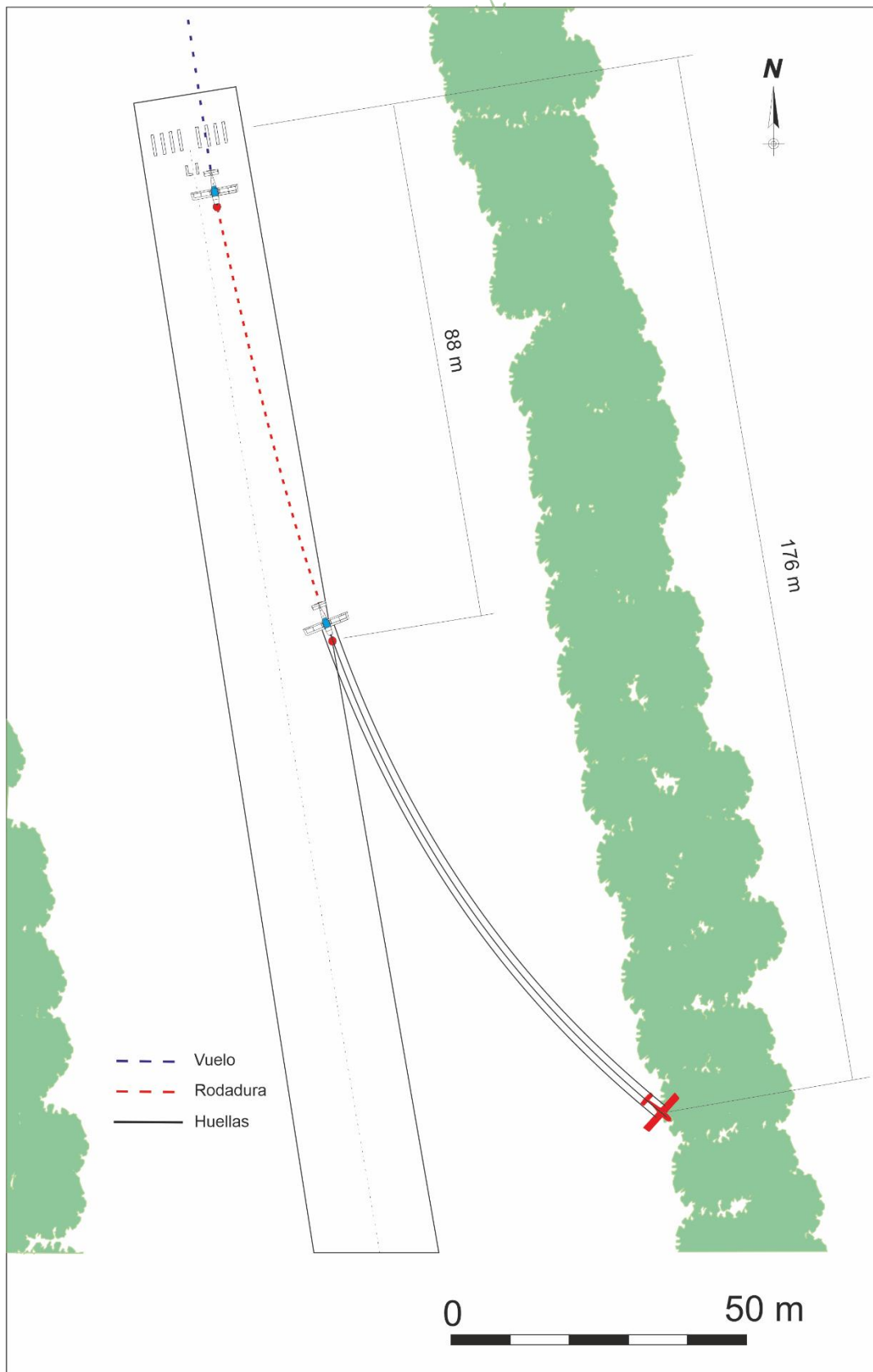


Fig. no. 3 - Detail of the track marks on the ground

1.13. Medical and pathological information

There is no evidence to suggest that the pilot's actions were affected by any physiological factors or disabilities.

1.14. Fire

No fire broke out.

1.15. Survival aspects

The harnesses and restraint systems worked adequately, and the cabin interior maintained its structural integrity.

1.16. Tests and research

The brake system was inspected in more detail once the wreckage had been moved to a hangar at San Torcuato Aerodrome.

A second operational test was performed from both the pilot and co-pilot positions. The system was found to be working correctly, with the movement of the pistons and pads against the discs being visible.

As regards the condition of the components inspected, there was considerable and uneven wear to the friction material that rubs against the disc on the inner pad of the right wheel brake.



Fig. no. 4 - Wear to the right inner brake pad

Visually, it was apparent that the thickness of this layer varied across the different areas of the pad to the point where it was practically non-existent at one end.

The other pads had minimal, evenly distributed wear.



Fig. no. 5.- Condition of the brake pads

1.17. Organisational and management information

N/A

1.18. Additional information

1.18.1 Steering and braking system.

The system that concerns us basically consists of pedals from which the appropriate commands are transmitted to the aircraft's steering and braking system.

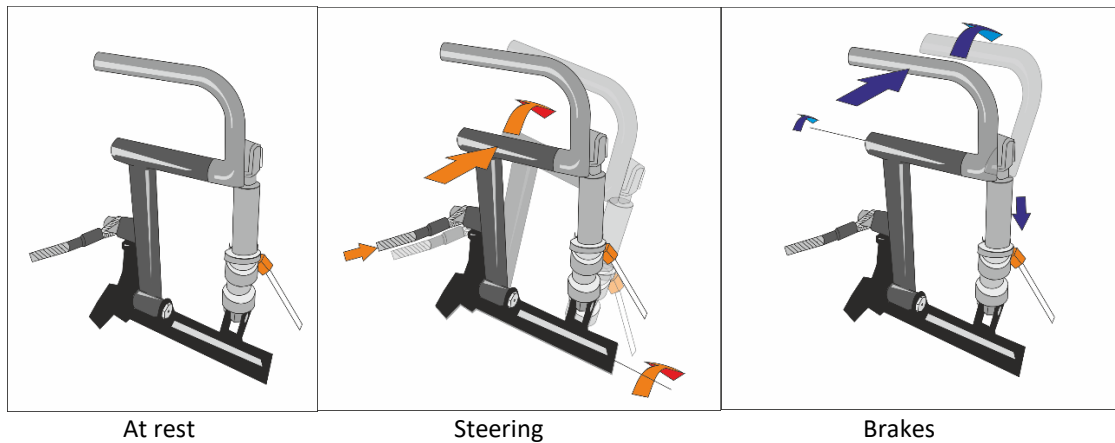


Fig. no. 6.- Steering and braking system

Putting pressure on one bar or the other dictates the effect achieved:

- The rotation of the pedals achieved by applying pressure to the lower bar of the pedal causes a change of direction towards the pedal pressed (they are connected, so when one moves forwards, the other moves back).
- Applying pressure to cause a slight rotation of the pedal's upper bar activates the hydraulic pressure that operates the brakes.

1.19. Useful or effective investigation techniques

N/A

2. ANALYSIS

2.1 General aspects

The pilot held the required licence and relevant medical certificates for the flight.

The aircraft had the correct documentation for the flight.

2.2 Regarding the weather conditions

The data recorded at the different meteorological stations in the area and the information provided by the eyewitnesses indicate non-limiting meteorological conditions for the flight.

2.3 Regarding the wreckage

The tracks on the ground were consistent with the contact made by the landing gear wheels as the aircraft taxied. Furthermore, there was no evidence to suggest the aircraft braked, either on or off the runway, and this was supported by the condition of the tyres, which showed no signs of friction against any surface.

Consequently, as per the pilot's indications, we can establish that the aircraft did not brake at any time.

The brake system inspection revealed a high level of uneven wear to the friction material that rubs against the disc on the inner pad of the right main gear leg. As a consequence of the uneven wear, the thickness of the friction layer varied from a similar magnitude to the rest of the pads at one end to almost non-existent at the opposite end.

Given the way in which the friction layer has worn away, it is reasonable to conclude that at no time has the entire surface of the friction layer been in contact with the disc surface, which leads us to believe that, comparatively speaking, this brake could never have worked as effectively as the brake on the left wheel, the difference being more noticeable the faster the brakes were applied.

Nevertheless, the abnormal condition of one of the right brake pads does not imply a total malfunction of the brake system as a whole and certainly not of the left brake.

2.4 Regarding the operation

During the landing rollout, the engine was running at a speed of 2700/2800 rpm, which was not conducive to braking the aircraft.

Taking into account the properties of the runway – 420 m long with a grass surface – and those of the aircraft, which, according to its flight manual, requires a landing rollout of 217 m to come to a complete stop on a runway like the one in question – we can state that the aircraft could have rolled to a standstill without the need for the brakes to be applied.

Given, in addition, the conditions and dimensions of the site on which the runway is located – a 700 m long, 90 m wide, unobstructed, compacted grass field – it is clear that there was a considerable margin for a safe landing, even without using the brakes.

On the other hand, according to the pilot, he gently and repeatedly touched the brakes immediately after touching down to slow down his landing rollout, but to no avail. In addition to not slowing down, the aircraft began to veer to the left, which would be consistent with the right wheel braking less effectively than the left, this effect being more noticeable the higher the speed at the time the brakes were applied.

Subsequently, the pilot said that he braked forcefully and that, despite this, the aircraft did not slow down at any time during the rollout, nor was he able to correct the aircraft's path, either by using the rudder or applying differential pressure to the brakes.

Even if the pilot started to correct the trajectory at a speed at which the steering rudder efficiency was already low, applying the brakes, regardless of the efficiency differential between them, would have made it possible, using more or less pressure, to regulate the braking intensity of each wheel separately and thus correct the trajectory.

Clearly, heavy braking, whether both brakes together or separately, would have left unmistakable marks on the ground.

Taking into account the circumstances described above, and given that, both during the previous flight and after the event, the system was working correctly, it seems logical to conclude that the correct operation of the braking and steering system may have been affected by another factor as the aircraft was taxiing.

For example, at some point during the rollout pressure may have been inadvertently applied to the lower rather than the upper pedal bar, activating the steering rather than the brakes. Moreover, even if only slightly more pressure were applied to the left pedal than the right, the aircraft would respond by deviating from its trajectory to the left.

3. CONCLUSIONS

3.1 Confirmed findings

There were no limiting meteorological conditions for the flight.

The aircraft was not aligned with the centreline when it began its landing rollout.

The landing rollout was not controlled at any point.

No braking marks were found on or off the runway.

The steering and braking system would have allowed the pilot to steer and brake the aircraft.

3.2 Causes/contributing factors

The accident was caused by a failure to perform the landing manoeuvre correctly, which led to the loss of control of the aircraft and subsequent runway excursion.

4. OPERATIONAL SAFETY RECOMMENDATIONS

None