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Report A-033/2020

Accident involving a VANS RV-9A aircraft, registration EC-XLF, on 22 August 2020 at Tiétar Aerodrome, La Iglesuela (Toledo)

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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 (CIAIAC) regarding the circumstances of the accident object of the investigation, and its probable causes and consequences.

In accordance with the provisions in Article 5.4.1 of Annex 13 of the International Civil Aviation Convention; and with articles 5.5 of Regulation (UE) nº 996/2010, of the European Parliament and the Council, of 20 October 2010; Article 15 of Law 21/2003 on Air Safety and articles 1., 4. and 21.2 of Regulation 389/1998, this investigation is exclusively of a technical nature, and its objective is the prevention of future civil aviation accidents and incidents by issuing, if necessary, safety recommendations to prevent from their reoccurrence. The investigation is not pointed to establish blame or liability whatsoever, and it's not prejudging the possible decision taken by the judicial authorities. Therefore, and according to above norms and regulations, the investigation was carried out using procedures not necessarily subject to the guarantees and rights usually used for the evidences in a judicial process.

Consequently, any use of this report for purposes other than that of preventing future accidents may lead to erroneous conclusions or interpretations.

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Abbreviations

°	Sexagesimal degree
°C	Degrees Celsius
AEMET	Spain's State Meteorological Agency
AESA	Spain's National Aviation Safety Agency
CV	Metric horsepower
ft	Feet
GS	Ground speed
h	Hours
hPa	Hectopascals
kg	Kilogrammes
km	Kilometres
km/h	Kilometres per hour
kt	Knots
LETI	ICAO code for Tiétar Aerodrome
LT	Local time
m	Metres
METAR	Meteorological aerodrome report
PPL	Private Pilot License
QNH	Altimeter setting to obtain elevation above sea level when on the ground
SEP	Single-engine piston
ULM	Ultralight motorised aircraft
UTC	Coordinated Universal Time
VFR	Visual flight rules
V/S	Vertical speed

Synopsis

Operator:	Private
Aircraft:	VANS RV-9A, EC-XLF
Date and time of accident:	22/August/2020, 12:30 LT[1]
Site of accident:	Tiétar Aerodrome. La Iglesuela (Toledo)
Persons on board:	One unharmed and one seriously injured
Type of flight:	General aviation - Private
Flight rules:	VFR
Phase of flight:	Landing- Other
Date of approval:	24/March/2021

Summary of incident

On Saturday, 22 August 2020, the VANS RV-9A aircraft, registration EC-XLF, suffered an accident during landing on runway 22 at the Tiétar Aerodrome.

The aircraft had taken off with two occupants on board, for a local round-trip flight.

On landing at the end of the flight, the aircraft bounced off the runway and lifted back into the air, following a curved trajectory to the left until, after passing the aerodrome perimeter fence, it impacted the ground in an adjacent plot of land.

The pilot was unharmed and the passenger suffered minor injuries. The aircraft sustained significant damage.

The investigation has concluded the accident was caused by the loss of control that resulted from a flawed attempt to correct a bounced landing.

[1] Unless specified otherwise, all times in this report are local. On the day of the incident, local time was equivalent to UTC+2 hours

1. FACTUAL INFORMATION

1.1. History of the flight

On Saturday, 22 August 2020, the VANS RV-9A aircraft, registration EC-XLF, had transferred from the Robledillo de Mohernando Aerodrome (Guadalajara) to the Tiétar Aerodrome in the municipality of La Iglesuela (Toledo).

After arriving at Tiétar at approximately 12:00 h, it took off again for a local flight with the pilot and a passenger on board.

After an approximately thirty-minute flight, they prepared to return to Tiétar and land on runway 22.

During the landing, on making contact with the runway just after the runway designation numbers, the aircraft bounced back into the air.

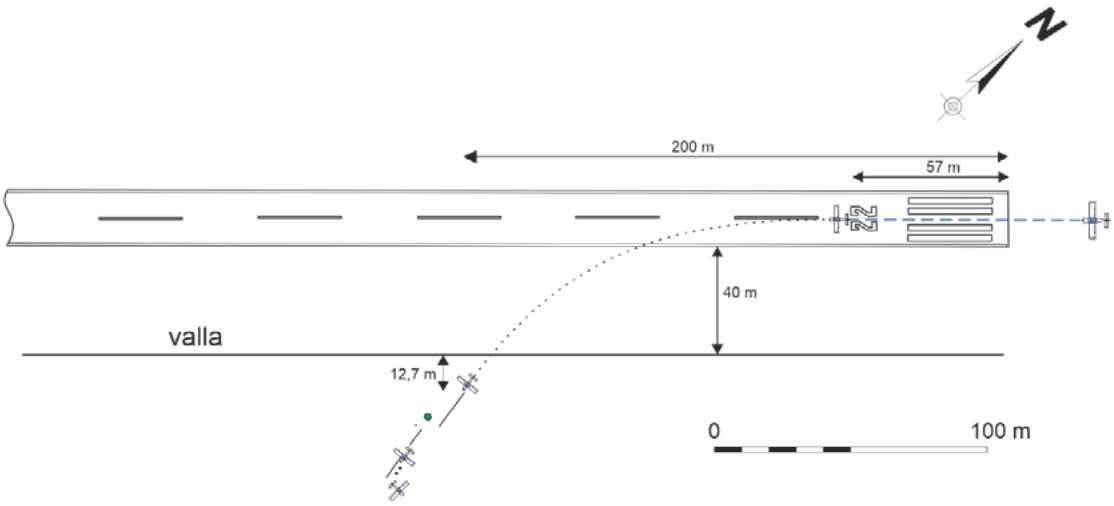

Fig. no. 1 - Diagram of the aircraft's trajectory

According to the pilot, when they bounced back into the air, he applied power in an attempt to fly the aircraft and land further along the runway. However, the aircraft veered to the left, and despite his attempts to correct the direction by applying pressure with his right foot, he was unsuccessful. As a result, the aircraft continued to veer to the left, deviating approximately 45° from its original path.

The aircraft then made it over the aerodrome's perimeter fence, making contact with the ground on an adjacent property with its left main gear wheel first, followed by its nose wheel and then the right main gear wheel. It finally came to a halt after a pronounced yaw to the left.

The pilot was unharmed and the passenger suffered minor injuries. The aircraft sustained damage to its fuselage, wings, landing gear, propeller and engine.

Fig. no. 2 - Aircraft in its final position

1.2. Injuries to persons

Injuries	Crew	Passengers	Total in the aircraft	Others
Fatal				
Serious				
Minor		1	1	
Unharmed	1		1	
Total	1	1	2	

1.3. Damage to the aircraft

The aircraft sustained significant damage to its nose cone, landing gear and wingtips. The propeller hub and blades were also damaged.

1.4. Other damage

N/A.

1.5. Personnel information

1.5.1. Information about the crew of aircraft

The 50-year-old pilot had a private pilot license (PPL) for aircraft with a single-engine piston rating (SEP), issued by Spain's National Aviation Safety Agency (AESA) and valid until 31 October 2020. He also had a class 2 medical certificate, valid until 08 December 2020.

He had 329:55 h of flying experience as a PPL pilot, 187:27 h of which were in the type of aircraft involved in the accident. He also had 98:57 h of flying experience as a ULM pilot.

1.6. Aircraft information

The amateur-built aircraft was a VANS RV-9A with a maximum take-off weight of 795 kg. It was registered on 03 June 2013 with serial number 08105-2406. It has a 160 CV Lycoming XO-320-D1A engine with 236:30 h of operation and a SENSENICH two-blade aluminium propeller with a clockwise rotation seen from the cabin.

It had a special Restricted Certificate of Airworthiness issued by Spain's National Aviation Safety Agency, valid until 31 May 2020. The certificate also had a declaratory renewal granted on 01 May 2020, which qualified the aircraft to fly until AESA issued the new special Restricted Airworthiness Certificate.

The aircraft had accrued 219:54 h of flight time when it underwent the 200-hour/24-month type "D" scheduled overhaul, as per the maintenance programme approved by Spain's National Aviation Safety Agency (AESA) on 10 March 2020. During this overhaul, the aircraft (landing gear, corrosion, equipment operation check...), engine (filters, battery, spark plug condition, compression, fuel lines...) and the propeller (inspection of cuts and cracks in the cone and blades, possible leaks, bolt check...) were inspected.

On the date of the accident, the aircraft had accrued 233: 18 hours of flight time.

1.7. Meteorological information

According to the information provided by the State Meteorological Agency (AEMET), the meteorological conditions in the area at the time of the accident were scant or no cloudiness, good visibility, high temperatures and light winds (only occasionally exceeding 10 km/h and with maximum values below 25 km/h), depending on the orography. No significant phenomena.

There is no AEMET station in La Iglesuela del Tiétar; the closest are in Castillo Bayuela (19 km to the southeast), Puerto del Pico (21 km to the northwest), Rozas de Puerto Real (26 km to the west-northwest) and Talavera de la Reina (32 km to the south). The data collected at those stations at the time of the accident was as follows:

Castillo Bayuela (rainfall and temperature): temperature 29 °C, relative humidity 36%.

Puerto del Pico: temperature 23 °C, relative humidity 46 %.
Average wind speed 14 km/h from the south, maximum 22 km/h from the south.

Rozas de Puerto Real (rainfall and temperature): temperature 26 °C, relative humidity 40%.

Talavera de la Reina: temperature 28 °C, relative humidity 36 %, pressure 978 hPa.
Average wind speed 5 km/h from the southwest, maximum 12 km/h from the west.

The nearest aeronautical station is Madrid-Cuatro Vientos Airport (located approximately 87 km to the east-northeast). The aerodrome reports (METAR) recorded around the time of the accident indicated wind speeds of variable origin between 2-6 kt, good visibility, no clouds, temperature 27-29 °C, dew point 11-13 °C and QNH of 1023-1024 hPa.

METAR LEVS 220930Z 06003KT CAVOK 27/13 Q1024=
METAR LEVS 221000Z 16002KT CAVOK 28/13 Q1024=
METAR LEVS 221030Z VRB03KT CAVOK 29/11 Q1023=
METAR LEVS 221100Z VRB06KT CAVOK 29/11 Q1023=

1.8. Aids to navigation

N/A.

1.9. Communications

N/A.

1.10. Aerodrome information

Tiétar Aerodrome (LETI) is a restricted-use aerodrome located in the municipality of La Iglesuela, in the province of Toledo.

It has a fully paved runway designated 04-22, measuring 985 m long by 22 m wide.

Its elevation is 1411 ft.

1.11. Flight recorders

N/A.

1.12. Aircraft wreckage and impact information

The accident took place during landing on runway 22 at the Tiétar Aerodrome.

The aircraft's propeller hub and blades were damaged and it also sustained significant damage to its nose cone, landing gear and wingtips.

Fig. no. 3 - Detail of the damage to the aircraft

After touching down on the runway, the aircraft rebounded into the air, following a curved trajectory to the left. After passing the aerodrome perimeter fence, it travelled for 12.7 m before returning to the ground, making initial contact with its left main landing gear wheel.

At the end and to the right (according to the direction of travel) of a 14.5 m-long track mark, four 4.3 m-long transverse marks with two small holes at either end were observed. The tip of one of the propeller blades was found in the last of the holes.

Further on and to the right, according to the direction of travel, there was another 7 m-long track mark which then disappeared for 4 m and reappeared for another 9 m. Parallel to and 2 m away from this last track mark were two small holes set 1.5 m apart.

Finally, turned about 90° to the left according to the direction of travel, the aircraft was found resting on its nose and landing gear with its tail pointing upwards.

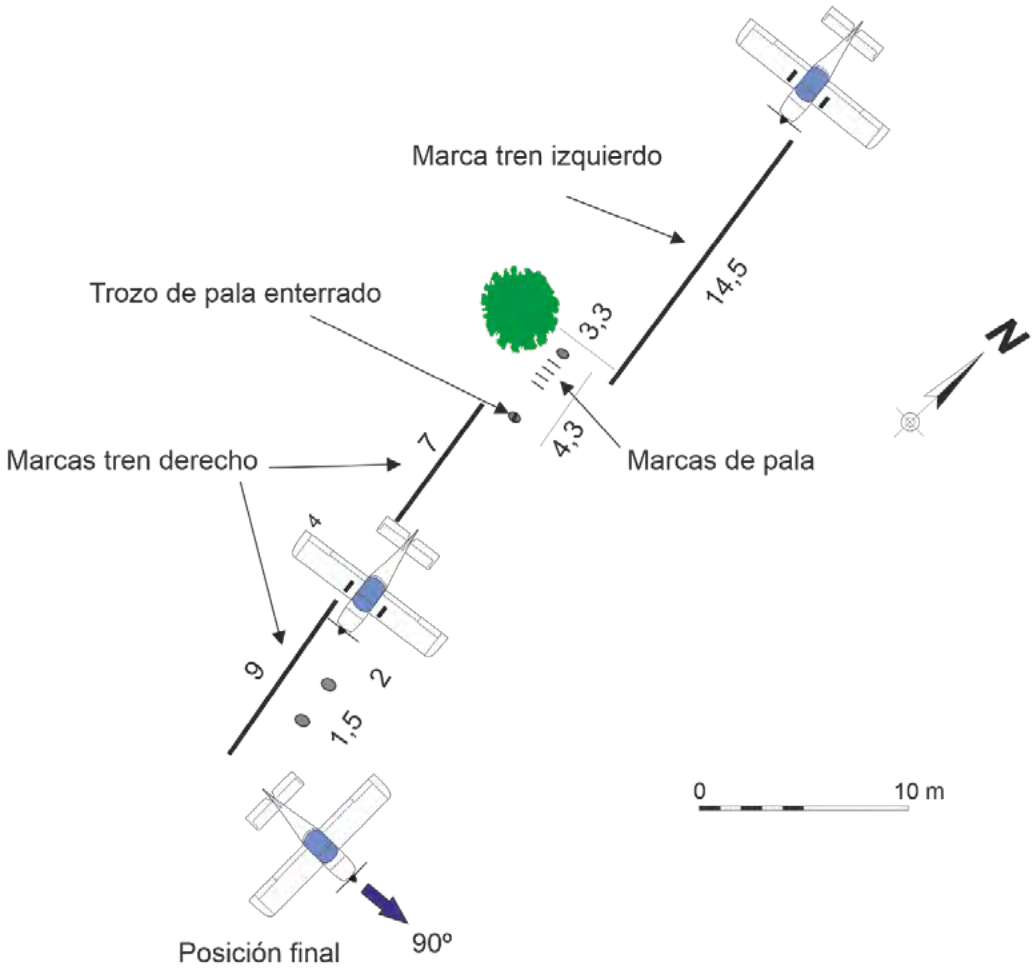

Fig. no. 4 - Diagram of the track marks and final position of the aircraft

1.13. Medical and pathological information

N/A.

1.14. Fire

There was no fire.

1.15. Survival aspects

The cabin maintained its structural integrity, and the harnesses worked efficiently.

1.16. Tests and research

1.16.1.Interview with the pilot

The pilot provided us with his account of the incident:

At around 12:00 h, I took off from the aerodrome with a passenger on board. On landing after a twenty-minute flight, I made contact with the runway, bounced and lost directional control, veering to the left and over the aerodrome perimeter fence before finally hitting the ground on an adjacent plot of land.

He added *the aircraft bounced heavily after the numbers and, finding myself in the air again, I increased speed to try and fly the aircraft and land further along the runway because it was long enough to do so, and, in any case, I thought I could always go around and do a new circuit.*

After I increased the speed, the aircraft veered 40° - 45° to the left and, despite trying to correct it by applying pressure with my right foot (to the extent that it hurt), the aircraft continued to veer to the left. I then turned my attention to getting over the fence and trying to stabilise the aircraft. Eventually, the aircraft hit the ground without me being able to do anything to improve the situation.

Asked specifically about his speed on landing, he said that he believed, although he was beginning to have doubts, that his speed was the appropriate 60 kt.

In trying to explain what had happened, he added that even during normal take-offs he has to apply a lot of right-foot pressure, and he assumes that, in this case, being at a lower speed, the effectiveness of the rudder was practically nil.

1.17. Organisational and management information

N/A.

1.18. Additional information

N/A.

1.19. Useful or effective investigation techniques

N/A.

2. ANALYSIS

2.1. General aspects

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

The pilot had extensive flight experience and knew the area well.

The aircraft had the correct documentation for the flight.

2.2. Of the meteorological conditions

The data recorded at the different meteorological stations in the area confirms non-limiting meteorological conditions for the flight.

2.3. Of the wreckage

Based on the pilot's description of the incident, the aircraft wreckage and the track marks on the ground, we have concluded that the aircraft touched down on the runway after the runway indicator numbers and that it bounced back into the air, following a curved path to the left and over the perimeter fence of the aerodrome.

The longitudinal 14.5 m-long track that begins 12.7 m from the fence suggests the aircraft made contact with the ground at that point and then rolled on its left main gear wheel, which would be consistent with the slight left-hand roll attitude the aircraft adopted after the bounce.

Subsequently, the 1.3 m-long transverse track marks are indicative of the propeller blades impacting the ground as the aircraft lost speed and its nose lowered as a result.

Further on and to the right, according to the direction of the previous track marks, there were two aligned longitudinal tracks measuring 7 m and 9 m, with an intermediate section of 4 m bearing no track marks. These would have been made by the right main gear wheel rolling over the ground with a 4 m-long bounce in the middle.

All of the above indicates a clearly unstable second landing and roll out, with the aircraft initially making contact with the left wheel only, then with the right wheel only, and with contact being lost completely at some intermediate points.

2.4. Of the operation

According to the pilot's testimony, as he touched down on the runway, the aircraft bounced hard and lifted back into the air (before he applied power to the engine).

This energetic bounce occurred because the aircraft touched down with excess energy, and the investigation has determined that this excess energy was due to excessive vertical speed.

We have, therefore, concluded that the powerful bounce experienced by the aircraft was caused by its high vertical speed at the moment it made contact with the runway.

Continuing with his testimony, the pilot claimed that after experiencing the pronounced bounce on landing and lifting back into the air, he applied power, the aircraft veered to the left, and he was subsequently unable to correct its path.

On this occasion, as expressed by the pilot, although he applied extreme pressure with his right foot, he was unable to correct the trajectory, blaming it on a loss of effectiveness of the tail rudder control.

Furthermore, given the pilot's intention to take to the air and land further ahead, it's perfectly possible that as he applied power he pulled on the controls in an attempt to keep the aircraft up.

Therefore, we can determine that in demanding more power from the engine in a manner that, under the circumstances, was unlikely to have been gradual, the pilot himself caused the aircraft to veer to the left.

3. CONCLUSIONS

3.1. Confirmed findings

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

The aircraft had the correct documentation for the flight.

There were no limiting meteorological conditions for the flight.

On making contact with the runway, the aircraft bounced heavily as a result of excessive speed.

By demanding more power from the engine, the pilot caused the aircraft to veer to the left.

3.2. Causes/contributing factors

The investigation has concluded the accident was caused by the loss of control that resulted from a flawed attempt to correct a bounced landing.