

DATA SUMMARY

LOCATION

Date and time	Saturday, 14 April 2007; 10:15 local time
Site	Casas de los Pinos Aerodrome (Cuenca)

AIRCRAFT

Registration	EC-JOE
Type and model	PILATUS PC-6 B1-H2 Turbo Porter
Operator	Aerobalas

Engines

Type and model	PRATT AND WHITNEY PT6A-20
Number	1

CREW

Pilot in command

Age	28 years
Licence	Commercial pilot license
Total flight hours	650 h
Flight hours on the type	138 h

INJURIES

	Fatal	Serious	Minor/None
Crew			1
Passengers			1
Third persons			

DAMAGE

Aircraft	Serious
Third parties	None

FLIGHT DATA

Operation	Aerial work – Commercial – Parachute drop
Phase of flight	Landing

REPORT

Date of approval	25 July 2007
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1. FACTUAL INFORMATION

1.1. History of the flight

On Saturday, 14 April 2007, at 10:15 local time, aircraft EC-JOE, with a pilot and passenger onboard, ran off runway 30 at the Casas de Los Pinos aerodrome while landing. The aircraft, used for parachuting operations, was making a reconnaissance flight before the parachuting flights, which were scheduled for later. According to the pilot's statement, during the flare, and before touching down, a gust of wind lifted the left wing. The pilot used left rudder and tilt to try to level the aircraft, but could not keep it from exiting the runway. As stated by the pilot, the approach was performed without flaps, at a speed of 70 kt and with the aft gear locked.

The aircraft ended up 25 m from the edge of the runway on a heading of 190°, resting on its lower fuselage, which was damaged along its underside, as were the left aileron and the horizontal stabilizer. The right main landing gear was bent outward, the left gear had detached and was 30 m away from the aircraft, and the propeller had detached at the reduction gearbox and was next to the aft landing gear to the left of the aircraft.

Both occupants were able to exit the aircraft under their own power. The pilot received a slight injury to his chin and the passenger was unhurt.

1.2. Wreckage and impact information

The aircraft departed the runway at about a 30° angle, leaving marks on the ground with its propeller, main landing gear and fuselage. After traversing 50 m, the aircraft veered left before finally coming to a stop on a heading of 190°.



Figure 1. Final condition of the aircraft

The tracks left by the aircraft were located outside the runway, in an area of hard, flat ground, and traced out a straight line up to the point where the aircraft made its last turn before coming to a stop. The first marks on the ground were from the main landing gear, and indicate that the gear kept its integrity following the runway excursion and that the impact to the left gear was greater than that to the right. The subsequent separation of the tracks in excess of the design distance between them suggests that the collapse of the right gear and the detachment of the left must have taken place within the first 25 m following the impact. A comparison of the tracks left by the landing gear and the fuselage indicates that the aircraft exited the runway while sliding slightly to the left.

The fuselage marks were more evident in the final 25 m, a single drag mark being noticeable until the final turn, at which point it split in two, with the engine marks on one side and the marks from the rest of the fuselage on the other. As the propeller detached, it left three deep grooves in the ground in the area where the aircraft turned left before coming to a stop.

The damage to the aircraft was as follows:

- **Engine and propeller:** the propeller detached from the engine at the reduction gearbox (RGB). The accessories were still attached to the accessory gearbox (AGB) and there was a slight clearance that allowed for movement between the AGB and gas generator crankcase, indicative of a crack in the air inlet housing. The propeller



Figure 2. Marks and final aircraft resting place

had not lost any blades, though they were bent and showed scrape marks in all directions.

- **Fuselage and cockpit:** the underside of the fuselage was damaged from sliding along the ground. In the cockpit, the floor and windshield were cracked, though it maintained its structural integrity.
- **Landing gear:** the left main gear detached. Its final resting place and the marks it left suggest it separated in the initial phase of the accident. Tire tracks from the left landing gear were found on the left side of the fuselage, behind the passenger door. The right gear, though bent outward, was attached to the fuselage. The aft gear was intact. The locking mechanism was warped such that even though the gear was in a locked position, it could still move in response to rudder input. Photographs taken after the accident show that the aft gear was locked.

The brake assemblies were sent to the manufacturer for inspection, which revealed normal wear and tear. All components were within specifications as far as dimensions are concerned, with the exception of the coating on the left brake, which showed wear in excess of limits.

- **Tail section:** the rudder had an impact mark on its lower outside corner, where it had struck the horizontal stabilizer. The elevator was bent downward as a result of the impact. The horizontal stabilizer actuator was cracked and had detached from its lower housing toward the front of the aircraft, indicative of deceleration.
- **Wings:** the left aileron was cracked due to the impact from the wing's left counterweight, which was dragged along the ground and subsequently detached. The flaps were retracted.

1.3. Personnel information

The pilot, who had been working for this operator for 8 months, had a commercial pilot's license dated August 2002. He was rated for single- and multi-engine piston, single-engine turbine and Pilatus aircraft, and had IFR and instructor ratings. The license, ratings and medical certificate were all valid at the time of the accident.

He had accumulated a total of 650 hours, 138 of them on the type. Since joining the company, he had flown the Pilatus PC-6. He had 56 hours of experience on the accident aircraft EC-JOE, all of them after 20 January 2007, he being the only pilot to have flown this aircraft since that date.

The pilot had recent experience at the La Mancha and Ocaña aerodromes. He had been flying out of the Casas de Los Pinos aerodrome for about a month, 6 days of which he

had gone on parachuting flights, the last on 25 March 2007. The week before the accident, the aircraft and pilot had been on parachuting operations at the Ocaña aerodrome. The flight from Ocaña to Casas de Los Pinos aerodrome had taken place on the day before the accident, Friday, 13 April 2007.

1.4. Aircraft information

The Pilatus PC-6 B1-H2 aircraft, S/N 705, was manufactured in 1969 and had been engaged in parachuting operations in Spain under French registration F-GZDO. On 27 April 2006 it was registered in Spain with a total of 8812 hours.

On 6 August 2005 this aircraft, still under French registration, experienced an engine failure resulting from a problem with a blade in the power turbine at the Ocaña aerodrome while on a parachuting flight. The engine, a Pratt and Whitney PT6A-20, S/N 22072, was repaired and was the same as that installed on the aircraft at the time of the accident with 8,962 total hours.

1.4.1. Maintenance information

According to its log, the aircraft had 9,046 flying hours. Its certificates, licenses and insurance were all valid. The last maintenance tasks had been two 100-hour inspections on 14 April 2006 and 12 January 2007, with 8,885 and 8,989 hours, respectively. The aircraft had flown 57 hours between the inspection of 12 January 2007 and the accident.

1.4.2. Additional information

The aircraft's landing gear consists of a main gear and an aft gear with a locking mechanism. The aircraft flight manual states that for taxiing, the aft gear must be selected to "steer," or not locked, in the cockpit, while for takeoff and landing it must be locked so as to facilitate directional control of the aircraft.

The aft gear's locking system is such that while locked, the leg is aligned with the fuselage, while in "steer," or not locked, the aft gear's movement is linked to that of the vertical stabilizer, which allows the aircraft to be steered while taxiing.

The stall speed listed in the flight manual for a weight of 4,850 lb (MTOW) without flaps is 52 kt. The aircraft's weight at the time of the accident was less than 4,850 lb, since it was not fully fueled and only one of the nine allowable passengers was onboard, which would have resulted in a stall speed below 52 kt.

1.5. Meteorological information

No meteorological information specific to the Casas de Los Pinos aerodrome is available, nor has any information regarding meteorological conditions or the frequency of wind gusts been found for the aerodrome.

1.5.1. *Information obtained on day of accident*

Meteorological conditions obtained from NOAA (National Oceanic and Atmospheric Administration) for the Casas de Los Pinos aerodrome site on the day of the accident showed winds from 120°-130° at 08:00 and from 0° at 11:00, both at 5 kt.

1.5.2. *Information provided by the INM*

The estimate from the INM (Instituto Nacional de Meteorología, National Weather Institute) on the most likely weather conditions at the accident site, based on radar images, Albacete Airport METARs, general conditions over the peninsula and the forecasts for Cuenca and Albacete, is cloudy skies, without precipitation or storm-related phenomena, average to good visibility, winds out of the northwest at 5 to 15 kt and a temperature around 7 °C.

1.5.3. *Information provided by the pilot*

The pilot did not have access to weather information in the cockpit beyond what he could see out the window. In his post-accident notification to the Commission, he did not provide any information on the wind, reporting only the presence of scattered clouds and a 12° temperature. During the telephone conversation held with the pilot 10 minutes after the accident, he himself remarked that the windsock at the aerodrome indicated 3 kt abeam of runway 30 (from 120°).

1.6. Aerodrome information

The aerodrome at Casas de Los Pinos is a private facility located in the province of Cuenca near the town of La Roda. It has one paved runway, 12-30, measuring 719 m in length and 18 m wide. There is a path some 20 m away from and parallel to the runway.

1.7. Pilot statement

In his statement the pilot informed that he made the approach at 70 kt, without flaps as was his custom, and with the aft gear locked. During the flare a gust of wind lifted

the left wing, causing him to stall. He “gave it” some left rudder and tilted it to the left to try to regain control, but he ran off the runway. He could not recall any additional details or sounds in the cockpit.

2. ANALYSIS

On Saturday, 14 April 2007, aircraft EC-JOE took off from runway 30 at the Casas de Los Pinos aerodrome with a pilot and passenger onboard for a reconnaissance flight before commencing parachuting operations. The flight had been uneventful and the aircraft proceeded to initiate its approach and landing on runway 30. During the landing something happened which made the aircraft veer 30° to the right of the runway centerline. The lack of tracks on the runway indicate that the aircraft did not touch down on it. The proximity of the first tracks to the edge of the runway indicate the aircraft deviated from its path while at a low altitude.

The landing gear and propeller marks on the ground show that the aircraft initially contacted the ground at a slightly downward angle. The more pronounced marks on the left gear as compared to the right, and the impact of the counterweight on the left wing with the ground are consistent with the left roll and rudder maneuver described by the pilot as he tried to counteract the lift of the left wing. The horizontal stabilizer actuator fractured as the result of a sudden deceleration which must have taken place just after impact, probably at the same time as the main landing gear collapsed. From that point on, the aircraft slid along the ground on its fuselage until it came to a stop 50 m later. The propeller must have detached toward the end, after the first 20 m and beyond the path running alongside the runway.

2.1. Meteorology

The weather must be considered among the possible causes that led to the aircraft deviating from its course. The pilot stated that a gust of wind caused the accident. The pilot’s own observation of the windsock 10 minutes after the accident, along with the early hour and the estimated wind conditions for that day, do not suggest the presence of gusts or turbulence, though no available information exists to corroborate this point.

2.2. Aircraft

From a technical standpoint, the inspection of the brakes revealed excessive wear on the coating of the left brake, wear which could have reduced the braking capacity of the left gear and induced a deviation to the right. Since, however, the aircraft did not actually land on the runway, as evidenced by the lack of brake marks, the brakes were

never applied, and thus could not have influenced the outcome of the accident. For this same reason it is thought that the warping found in the aft gear's locking mechanism was produced after the impact, which confirms the absence of problems noted by the pilot before the accident.

The damage to the aircraft is thought to have been produced as a consequence of the impact, thus ruling out the existence of previous problems which may have played a part in the accident.

2.3. Operation

The speed at which, according to the pilot, the approach was carried out represents a 20 kt safety margin with respect to the stall speed. That is, the aircraft's speed was suitable for a landing without flaps and with gusts, which should have resulted in a controlled landing. This calls into question the possibility that the wind gust destabilized the aircraft and caused the runway excursion. The lack of additional data on the flight makes it impossible to determine whether the approach to the runway was stable or the landing maneuver adequate, either of which could have contributed to explaining the accident.

Moreover, the excess speed above stall speed seems too large for the aircraft to have stalled over such a short distance as described by the pilot. It seems unlikely, then, that the initial impact of the aircraft with the ground in a nose-down attitude was the result of the stall. Said attitude was more likely the result of an uncorrected diving maneuver while trying to recover the aircraft.

3. CONCLUSIONS

3.1. Findings

- The aircraft had all the required valid certificates and licenses.
- The aircraft was authorized to perform parachuting operations.
- The aircraft had 9,046 flying hours and had passed a 100-hour inspection on 12 January 2007, 57 hours prior to the accident.
- The pilot had a valid license.
- The pilot had 650 total flying hours, 138 on the type.
- The pilot had flown out of Casas de Los Pinos Aerodrome 6 days.
- All damage to the aircraft is considered to have been caused by the accident and non-existent before it.
- The coating on the left brake was worn in excess of limits, but this had no influence on the accident.
- The approach speed was some 20 kt above the MTOW stall speed.

3.2. Causes

It is not known why aircraft EC-JOE left runway 30 during the landing, though it seems obvious that the aircraft's path was altered while it was flying at a low altitude. The possibility that a technical problem with the aircraft caused the accident has been ruled out. It has not been possible to confirm if the wind was gusting at the aerodrome at the time of the accident, though even gusty conditions should not have affected control of the aircraft since its airspeed was high enough with respect to the stall speed.

4. SAFETY RECOMMENDATIONS

None.