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AVIACIÓN **C**IVIL

Report A-016/2017

Accident involving a Piper PA-18-150 aircraft, registration EC-JBP, at the Sabadell Airport (Barcelona, Spain) on 5 August 2017

GOBIERNO DE ESPAÑA
MINISTERIO DE FOMENTO

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SUBSECRETARÍA
COMISIÓN DE INVESTIGACIÓN DE ACCIDENTES E INCIDENTES DE AVIACIÓN CIVIL

NIPO Línea: 161-18- 168-X

NIPO Papel: 161-18-169-5

Depósito legal: M-21544-2018

Maquetación: David García Arcos

Impresión: Centro de Publicaciones

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Foreword

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.

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

Contents

Abbreviations

° ' "	Sexagesimal degrees, minutes and seconds
°C	Degrees centigrade
AEMET	National Weather Agency
AENA	Aeropuertos y Navegación Aérea
AESA	National Aviation Safety Agency
CPL(A)	Commercial pilot license (airplane)
ft	Feet
h	Hours
hp	Horsepower
IR	Instrument rating
kt	Knots
Km	Kilometers
LT	Local time
LELL	Sabadell Airport (ICAO code)
m	Meters
MEP	Multi-engine rating
METAR	Aerodrome weather report
SEP	Single Engine Piston
TWR	Tower
UTC	Coordinated universal time
VFR	Visual flight rules

Synopsis

Operator:	Sunfly, S. L.
Aircraft:	Piper PA-18-150, registration EC-JBP
Date and time of accident:	Saturday, 05 August 2017 at 17:18 LT[1]
Site of accident:	Sabadell Airport (LELL), Barcelona, Spain
Persons aboard:	1 occupant, not injured
Type of flight:	Aerial work – Commercial – Aerial advertising
Flight rules:	VFR
Phase of flight:	Landing – Landing run
Date of approval:	20 March 2018

Summary of accident:

On Saturday, 5 August at 17:18 local time, a Piper PA-18-150 aircraft, registration EC-JBP, suffered an accident while landing on runway 13 at the Sabadell Airport (LELL) after having made a banner-towing flight. The pilot was the only occupant aboard.

After releasing the banner, and while on short final, the pilot decided to execute a go-around when he felt the aircraft sink, but he could not keep the left landing gear leg from impacting the runway.

After doing a fly-by of the tower to verify that nothing was wrong with the landing gear, he proceeded to land on runway 13. After traveling approximately 70 m on the ground, the left leg collapsed, causing the left wingtip to impact the ground and the aircraft to drag for some 30 m.

The occupant was not injured but the aircraft was heavily damaged.

1 All times in this report are local unless otherwise specified. On the date of the accident, local time was UTC+2 hours.

The investigation has determined that the accident occurred due to the hard impact of the landing gear during the landing, which caused the fracture of one of the lugs that holds the shock cords for the struts that comprise the landing gear.

1. FACTUAL INFORMATION

1.1. History of the flight

The Piper PA-18-150 aircraft, registration EC-JBP, had gone on an initial banner towing flight on the morning of Saturday, 5 August 2017, that had lasted 2:30 h.

In the afternoon, it took off from the Sabadell Airport at 15:04 to make a second banner towing flight lasting approximately 2 h, with the pilot as the only occupant aboard.

After the flight, the aircraft returned to the Sabadell Airport, where it was cleared to release the banner and land on runway 13.

After releasing the banner, the pilot stated that while on short final, he experienced a sudden loss of altitude and decided to go around to keep from impacting the terrain, but he was unable to keep the landing gear from contacting the runway before the aircraft could regain altitude.

Once in the air, at 17:15, he informed the Tower of possible problems with the landing gear, so he decided to do a fly-by so that both his colleagues on the ground and the personnel in the tower could do a visual inspection to look for possible faults.

Having detected no problems, he proceeded to once more land on runway 13, touching down in the first third of the runway.

After traveling some 70 m, the left main landing gear leg collapsed, causing the left wingtip to strike the ground and the aircraft to drag along the runway for approximately 30 m. During this time, the aircraft veered gradually to the right until it exited into the parterre, at which time the aircraft turned sharply left before coming to a stop in the paved area of runway exit B.

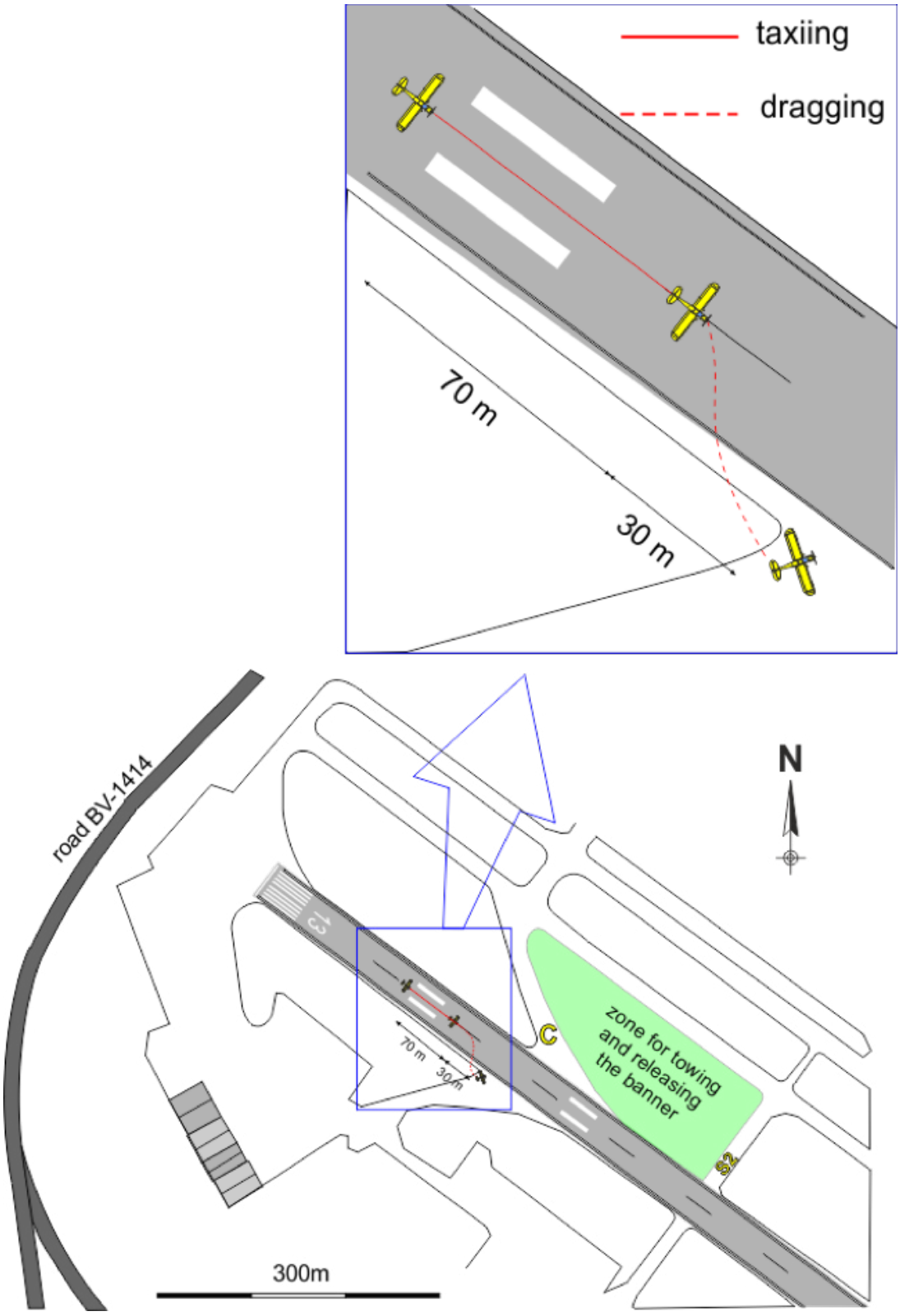


Figure 1. Diagram of the location of the wreckage and the path taken by the aircraft on the ground

The occupant was not injured, but the aircraft sustained significant damage to the propeller, left wingtip and left main gear leg.

Figure 2. Final condition of the aircraft

1.2. Injuries to persons

Injuries	Crew	Passengers	Total in the aircraft	Others
Fatal				
Serious				
Minor				
None	1		1	
TOTAL	**1**		**1**	

1.3. Damage to aircraft

The aircraft sustained significant damage to the left main gear leg, where one of the mounting lugs for the shock cord was broken, the left wingtip and the propeller.

1.4. Other damage

Two reflectors and cable trays at the edge of the runway were broken.

1.5. Personnel information

1.5.1. Information on the pilot of the aircraft

The pilot, a 32-year old Spanish national, had a commercial pilot license (CPL(A)) issued by the National Aviation Safety Agency (AESA) in 2011, with MEP (land), SEP (land) and IR (A) ratings, all of them valid and in force. Specifically, the SEP rating was valid until 30 June 2018.

According to information provided by the operator, the pilot had a total of 404 flight hours, 239:15 of which had been on the type. In the previous 24 h he had flown 4:30 h, and 26:30 h in the previous 30 days.

The pilot had been hired each season by SUNFLY, S.L. since 2014 to fly advertising banners with the same aircraft.

He also had the relevant class-1 medical certificate, which was valid until 27 April 2018.

1.6. Aircraft information

Aircraft EC-JBP is a two-seater PIPER PA18-150. It was manufactured in 1983 with serial number 18-8309001. It is equipped with a 150-HP LYCOMING o-320-A2B engine.

The aircraft had a Certificate of Airworthiness in the Aerial Work-3-Normal category, which was valid until 17 August 2017. It had been issued by the National Aviation Safety Agency.

1.6.1. Information on the aircraft's maintenance

According to the records provided by the operator, on 22 June 2017 the aircraft, which at the time had 5227 flight hours, underwent a scheduled 50-h maintenance check.

During this check, several parts of the aircraft were inspected, like the propeller (hub and blades), fuselage and empennage (battery, moving parts, etc.), landing gear (brakes, tires, etc.) and engine (filter, fuel system, cooling, exhaust). Various gauges in the cockpit also underwent a functional test.

The check of the shock cords is part of the items contained in the programmed maintenance 100-h check, which for this aircraft, had been carried out on 17 August

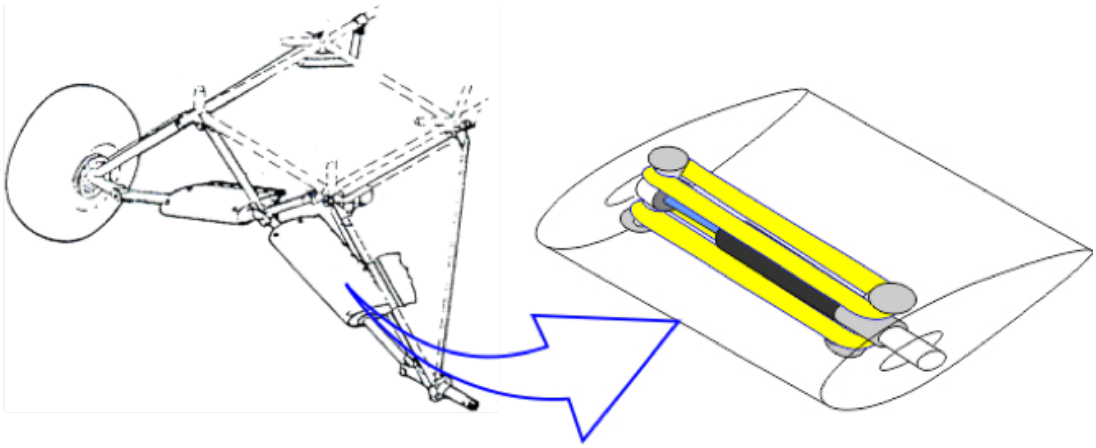
2016, with 5180 h on the aircraft. Said check did not reveal anything out of the ordinary.

According to the operator's records, the shock cords had been replaced on 31 May 2011 with 4283:38 flight hours on the aircraft.

1.6.2. Information on the landing gear

The Piper PA-18-150 aircraft has a tailwheel landing gear. The main landing gear has, in addition to the tires, a metal structure consisting of several tubes that give it the rigidity necessary to support the weight of the aircraft on the ground and that absorb much of the impact energy present on landing.

In addition to the tires, which are the first component to absorb part of this landing energy, the system has two struts (each one attached to one of the landing gear wheels), which in turn contain two lengths of tube, one short and one long. The short segment has a stem that is inserted partway into the long segment, allowing the two to move longitudinally with respect to each other. Both are joined by two cords, which are hooked on two lugs on each segment, such that when the stem is fully inserted into the long segment, the landing gear structure is kept in the retracted position (in flight or parked). When the landing gear makes contact on landing, the cords stretch, acting as a shock absorber by allowing the long segment to move over the stem, thus absorbing much of the impact energy.



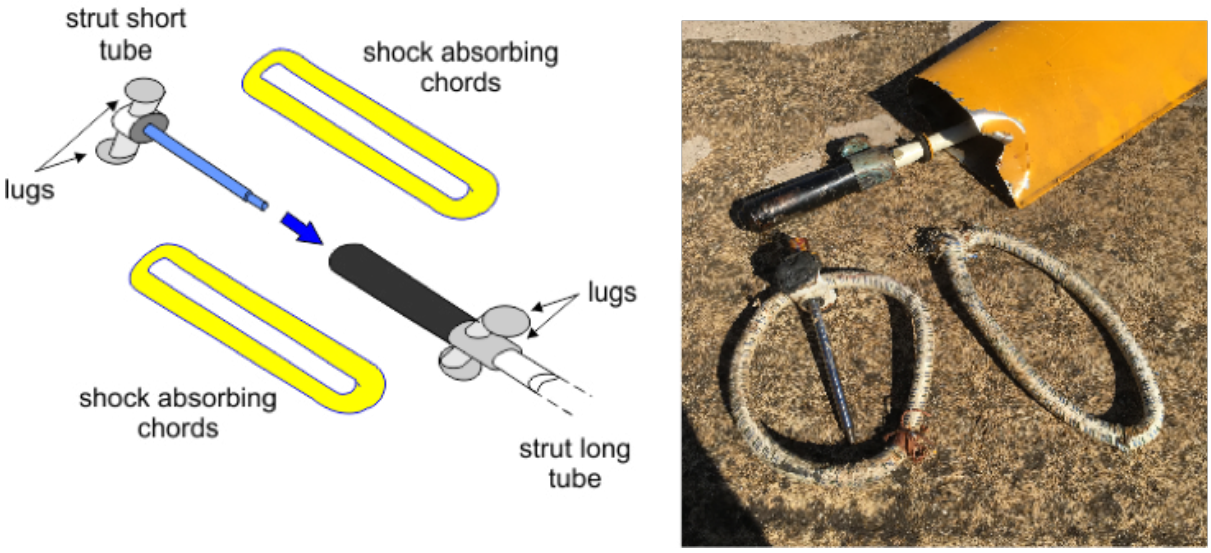


Figure 3. Diagram of landing gear

1.7. Meteorological information

According to data provided by the National Weather Agency (AEMET), and to the airport's records, the METARs for the Sabadell Airport between 14:30 and 15:30 UTC were as follows:

METAR LELL 051430Z 20009KT 150V250 9999 FEW040 36/17 Q1014=

METAR LELL 051500Z 19009KT 140V260 9999 FEW040 36/18 Q1014=

METAR LELL 051530Z 20009KT 140V250 9999 FEW040 36/18 Q1014=

Satellite images indicate there was barely any cloud cover. There was little wind (below 10 kt), though it did vary in direction from 140° to 260°. The temperature was around 36° C.

1.8. Aids to navigation

Not applicable.

1.9. Communications

The recordings of the communications between the aircraft and air traffic control services were available to investigators.

The pilot reported the possible failure of the landing gear, and although nothing unusual was identified visually during the fly-by of the tower, he recommended that the firefighting service be alerted.

Based on information supplied by the air traffic services provider, no aircraft were affected by windshear conditions during the approach to the runway either before or after the accident.

1.10. Aerodrome information

The Sabadell Airport (LELL) is located in the vicinity of the city of Sabadell, 10 km northwest of the city of Barcelona. It is at an elevation of 148 m (485 ft). The airport has one runway in a 13/31 orientation that is 1050 m long and 30 m wide.

During the course of the emergency, the airport activated the local alert level of its Emergency Plan at 17:15, followed by the general alarm at 17:18. The Emergency Plan was deactivated at 17:22.

1.11. Flight recorders

N/A.

1.12. Wreckage and impact information

The aircraft made two landing attempts on runway 13 at the Sabadell Airport. During the first, the pilot executed a go-around, although the main landing gear still impacted the ground at an excessive speed.

On the second and final attempt, the aircraft contacted the runway and traveled some 70 m before the left landing gear leg collapsed. This caused the left wingtip to make contact with the ground, and the aircraft dragged along the runway for approximately 30 m. During this time, the aircraft veered to the right until it exited into the parterre located between the runway and runway exit B, coming to a stop at the end of the exit after turning sharply left due to the nose digging into the ground, which caused the tail to rise up.

As a result of this, the aircraft sustained damage to the left main landing gear leg, the left wingtip and the propeller.

One of the lugs on the long segment of the strut on the left landing gear leg had broken off.

Figure 4. Close-up of fractured lug on left main landing gear leg

The wreckage was confined to a single point, where the Bravo exit joins the runway.

The damage to the airport facilities consisted of two reflectors and some cable trays along the edge of the runway being broken.

Figure 5. Condition of the main landing gear

1.13. Medical and pathological information

N/A.

1.14. Fire

N/A.

1.15. Survival aspects

The sole occupant exited the aircraft under his own power. He was not injured.

1.16. Tests and research

1.16.1. Statement from the pilot

"After successfully towing the advertising banner, the Sabadell tower cleared me to land on runway 13.

At the threshold I experienced strong windshear, which made the airplane drop. In anticipation of a possible collision, I applied full thrust, but the engine did not respond properly, which caused the main gear to touch down, and harder than desired.

In light of this, I decided to go around and report to the Tower possible problems with the landing gear. The Tower asked me if I wanted to declare an emergency, but I decided not to before checking it first.

I did a fly-by of the tower which confirmed that, visually, everything looked alright. My colleagues on the ground also informed me on the radio that there did not seem to be any problems. I suggested to the Tower personnel that they have the firefighters standing by. After being cleared by the LELL tower, I proceeded to land. I touched down in the first third of the runway with full flaps, as gently as possible.

After traveling 50-70 m, the left main gear wheel collapsed, causing the left wingtip to impact the ground. I tried to stabilize the airplane as well as I could over the 20-30 m the airplane was dragging over the runway, but it veered right, into the parterre. When it struck the dirt, it made the nose of the airplane turn sharply to the left, with the propeller impacting the asphalt of runway exit B at the LELL airport.

The airplane stopped and after securing the cockpit, I exited it as quickly as possible. The firefighters reported to the site in less than one minute and after verifying that everything was OK and that I was not injured, they proceeded to clear the runway, moving the aircraft to the R1 apron for future inspection".

1.16.2. Video evidence

The videos from several security cameras at the airport were provided to investigators by AENA. These videos, despite their low resolution, show the final approach of the first landing, as well as the aircraft's path on the ground during the final landing.

As concerns the final approach of the first landing, the videos show a shallow approach at low altitude, during the final segment of which the airplane's altitude drops suddenly while descending, with the airplane making contact with the runway before the threshold marking.

Figure 6. Approach path during first landing

As for the aircraft's path on the ground after the final landing, the aircraft is seen dragging its left wingtip along the runway. Also seen is the final turn to the left, with the nose resting on the parterre and the tail rising up in the air.

1.17. Organizational and management information

N/A.

1.18. Additional information

1.18.1. Operations Manual

Section 14, Aerial Work, of the company's Operations Manual details, among other aspects, the activity of towing aerial advertising banners, and indicates the method for releasing the banner. This involves flying over the field and when over the correct location, actuating the hook lever before turning downwind and landing normally.

1.18.2. Letter of Agreement

Point 2, Operating Procedures, of the Letter of Agreement between the Sabadell Airport, the Control Tower and advertising banner operators, states that the designated area for picking up and releasing the banner is the parterre between S2 and C (see Fig. 1). It also indicates that the TWR will allow the use of the short pattern west of the field for picking up and releasing the banner.

1.18.3. Owner's Manual

Section V, on General Maintenance, contains a sub-section on servicing the landing gear, which only states that the shock cords in the landing gear, which are enclosed in streamlined shock cord covers, should be inspected regularly for signs of wear. The

shock struts and landing gear hinge bolts should be kept properly lubricated with light grease or oil.

1.19. Useful or effective investigation techniques

N/A.

2. ANALYSIS

2.1. General

The aircraft's pilot was in possession of the flying license and medical certificate needed to conduct the flight.

The pilot had experience on the aircraft type.

The aircraft had the documentation required for the flight.

The aircraft had been maintained in keeping with the manufacturer's requirements, and its overall condition was good.

The flight was not limited by the weather conditions.

2.2. Of the wreckage

An analysis of the wreckage and of the airport security footage revealed that the aircraft traveled on the runway supported by the left landing gear leg (already collapsed) and by the left wingtip. Once the aircraft entered the parterre, the propeller also made contact with the ground and with the asphalt of runway exit B.

The lug of the long segment of the strut on the left landing gear leg was verified to be broken, which rendered one of the shock cords unusable and made it impossible for the sole remaining shock cord to keep the landing gear structure in the retracted position.

2.3. Of the operation

According to the pilot's statement, and as observed in the videos from the airport's cameras, in the final segment of the first final approach, the aircraft experienced a sudden drop in altitude while on the glide slope that caused it to contact the ground before the threshold marking at an excessive speed. It could not be determined if this occurred due to windshear or to a deliberate action by the pilot. Although no other aircraft reported being affected by windshear conditions, the prevailing weather conditions at the time of the accident, with variable wind from the south and a temperature of around 36° C, are perfectly consistent with the presence of windshear phenomena.

In these circumstances, the pilot also stated that he decided to go around to avoid a possible collision with the runway. To do so, he applied full power but the engine, in his opinion, did not respond properly and the landing gear made contact with the runway harder than desired.

As for the engine's response, whether adequate or not, after the pilot commanded maximum power, the engine continued to run after the event, with the airplane climbing and resuming its flight and completing two more patterns. The completion of the climb (and the power demand that entails) and the two subsequent patterns without any abnormality being observed by the pilot rule out an engine malfunction. Therefore, instead of the engine responding incorrectly, it seems more likely that the pilot demanded the power too close to the ground, which would have required the engine to respond instantaneously, something that is not physically possible.

What is clear is that the aircraft's main landing gear hit the runway hard, and most likely in a position that was not entirely stabilized, and that the impact was supported primarily and initially by the left main landing gear leg. This would be consistent with the fracture of one of the lugs on the left strut.

3. CONCLUSIONS

3.1. Findings

- The aircraft's documentation was valid and it had been maintained according to the manufacturer's specifications.
- The pilot had a valid license and medical certificate.
- The pilot had experience flying the aircraft type.
- The flight was not limited by the weather conditions.
- The aircraft experienced a sudden loss of altitude while on the final segment of the approach.
- The landing gear hit the runway hard.
- The aircraft went around, flying two patterns without any engine problems.
- No damage was evident on the first fly-by, and on the second pattern the pilot made the final landing.
- The left landing gear leg collapsed.
- The aircraft dragged along the runway, with the left landing gear leg and left wingtip in contact with the ground.
- The lug on the long segment of the strut on the left landing gear leg was found broken.

3.2. Causes/Contributing factors

The accident occurred due to the hard impact of the landing gear during the landing, which caused the fracture of one of the lugs that holds the shock cords for the struts that comprise the landing gear.