

**COMANDO DA AERONÁUTICA**  
**CENTRO DE INVESTIGAÇÃO E PREVENÇÃO DE**  
**ACIDENTES AERONÁUTICOS**



**FINAL REPORT**  
**A-061/CENIPA/2022**

<b>OCCURRENCE:</b>	<b>ACCIDENT</b>
<b>AIRCRAFT:</b>	<b>PT-OUB</b>
<b>MODEL:</b>	<b>PA-25-235</b>
<b>DATE:</b>	<b>03MAI2022</b>



## NOTICE

*According to the Law n  7565, dated 19 December 1986, the Aeronautical Accident Investigation and Prevention System – SIPAER – is responsible for the planning, guidance, coordination, and execution of the activities of investigation and prevention of aeronautical accidents.*

*The elaboration of this Final Report was conducted considering the contributing factors and hypotheses raised. The report is, therefore, a technical document which reflects the result obtained by SIPAER regarding the circumstances that contributed or may have contributed to triggering this occurrence.*

*The document does not focus on quantifying the degree of contribution of the distinct factors, including the individual, psychosocial or organizational variables that conditioned the human performance and interacted to create a scenario favorable to the accident.*

*The exclusive objective of this work is to recommend the study and the adoption of provisions of preventative nature, and the decision as to whether they should be applied belongs to the President, Director, Chief or the one corresponding to the highest level in the hierarchy of the organization to which they are being forwarded.*

*This Final Report has been made available to the ANAC and the DECEA so that the technical-scientific analyses of this investigation can be used as a source of data and information, aiming at identifying hazards and assessing risks, as set forth in the Brazilian Program for Civil Aviation Operational Safety (PSO-BR).*

*This Report does not resort to any proof production procedure for the determination of civil or criminal liability, and is in accordance with Appendix 2, Annex 13 to the 1944 Chicago Convention, which was incorporated in the Brazilian legal system by virtue of the Decree n  21713, dated 27 August 1946.*

*Thus, it is worth highlighting the importance of protecting the persons who provide information regarding an aeronautical accident. The utilization of this report for punitive purposes maculates the principle of “non-self-incrimination” derived from the “right to remain silent” sheltered by the Federal Constitution.*

*Consequently, the use of this report for any purpose other than that of preventing future accidents, may induce to erroneous interpretations and conclusions.*

**N.B.: This English version of the report has been written and published by the CENIPA with the intention of making it easier to be read by English speaking people. Considering the nuances of a foreign language, no matter how accurate this translation may be, readers are advised that the original Portuguese version is the work of reference.**

## SYNOPSIS

This is Final Report of the 3<sup>rd</sup> May 2022 accident involving the model PA-25-235 aircraft, registration marks PT-OUB. The accident was typified as “[LOC-I] Loss of Control in Flight and [LALT] Low Altitude Operation”.

The aircraft was about to perform a repositioning turn on a crop-dusting flight when loss of control occurred, and the airplane subsequently collided with the ground.

It was found that the fractures and dents of the wing struts were caused by “overload mechanisms”.

The aircraft sustained substantial damage.

The pilot suffered no injuries.

Being Argentina the State of aircraft manufacture, an Accredited Representative of the Argentinian *Junta de Seguridad en el Transporte* (JSB) was designated for participation in the investigation of the accident.

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**GLOSSARY OF TECHNICAL TERMS AND ABBREVIATIONS**

ANAC	Brazil's National Civil Aviation Agency
CENIPA	Brazil's Aeronautical Accidents Investigation and Prevention Center
CIV	Pilot Logbook
CMA	Aeronautical Medical Certificate
CVA	Certificate of Airworthiness Verification
DGPS	Differential Global Positioning System
JST	<i>Junta de Seguridad en el Transporte - Argentina</i>
LABDATA	CENIPA's Flight Recorders Data Readout and Analysis Laboratory
MNTE	Single-Engine Land Airplane Class Rating
OM	Maintenance Organization
PAGA	Agricultural Airplane License - Airplane
PCM	Commercial Pilot License - Airplane
PIC	Pilot in Command
PMD	Maximum Takeoff Weight
PPR	Private Pilot License - Airplane
PSO-BR	Brazil's Civil Aviation Safety Program
SACI	Integrated Civil Aviation Information System
SIPAER	Aeronautical Accidents Investigation and Prevention System
TPP	Private Air Services Registration Category
UTC	Coordinated Universal Time

## 1. FACTUAL INFORMATION.

<b>Aircraft</b>	<b>Model:</b> PA-25-235 <b>Registration:</b> PT-OUB <b>Manufacturer:</b> <i>Laviasa</i> .	<b>Operator:</b> Private.
<b>Occurrence</b>	<b>Date/time:</b> 03MAI2022 - 20:15 (UTC) <b>Location:</b> <i>Fazenda Promessa</i> <b>Lat.</b> 14°18'03"S <b>Long.</b> 047°27'26"W <b>Municipality – State:</b> <i>Alto Paraíso de Goiás – State of Goiás</i> .	<b>Type(s):</b> [LOC-I] Loss of control - inflight [LALT] Low altitude operations

### 1.1. History of the flight.

The aircraft took off from the airstrip for agricultural use of *Fazenda Promessa*, in the municipality of *Alto Paraíso de Goiás*, State of *Goiás*, in order to perform a crop-dusting flight, with 01 POB (pilot).

The aircraft was about to perform a repositioning turn when there was loss of control in flight, causing the airplane to collide with the ground.



Figure 1 - Final position of the aircraft.

The aircraft sustained substantial damage. The pilot suffered no injuries.

### 1.2. Injuries to persons.

Injuries	Crew	Passengers	Others
Fatal	-	-	-
Serious	-	-	-
Minor	-	-	-
None	1	-	-

### 1.3. Damage to the aircraft.

The aircraft sustained substantial damage. The main landing gear was *crumpled*, the engine mount was broken, the propeller assembly separated from the engine shaft, the wing struts were deformed, and the left wing was partially separated upwards and backwards (position closest to the root, approximately one-third of its length).

The left strut displayed a “V”-shaped bend, in addition to dents. The right-hand strut had several dents, but retained its original shape.



The cockpit remained preserved, as did the rear section of the fuselage, except for the vertical stabilizer, which showed damage to its upper part (Figure 2).



Figure 2 - Detail of the wing struts and cockpit preservation.

The tip of the left-hand wing was found approximately 10 m from the site, in the direction of the crash. The propeller assembly was torn from the engine shaft and was found in an intermediate position between the tip of the left wing and the wreckage concentration.

Figure 3, below, shows an overview of the curvature of the propeller blades, both of which had transverse scratches caused by the collision with the ground.



Figure 3 - View of the propeller blades.

#### 1.4. Other damage.

The vegetation near the wreckage had signs of damage in the direction of the aircraft's movement.

## 1.5. Personnel information.

### 1.5.1. Crew's flight experience.

FLIGHT EXPERIENCE	
	PIC
Total	1.223:55
Total in the last 30 days	30:00
Total in the last 24 hours	05:00
In this type of aircraft	300:00
In this type in the last 30 days	30:00
In this type in the last 24 hours	05:00

**RMK:** data obtained from the digital Individual Flight Logbook (CIV) of the ANAC's Integrated Civil Aviation Information System (SACI).

### 1.5.2. Personnel training.

The PIC (Pilot in Command) did the PPR course (Private Pilot – Airplane) in 2008 at the *Aeroclube de Brasília, Brasília*, Federal District.

### 1.5.3. Category of licenses and validity of certificates.

The PIC held a PCM License (Commercial Pilot - Airplane) and had valid ratings for MNTE (Single Engine Land Airplane) and PAGA (Agricultural Pilot - Airplane).

### 1.5.4. Qualification and flight experience.

The PIC stated that he had approximately 300 total hours in the model of aircraft and in the type of operation. From the data collected, the pilot was considered qualified and experienced in the type of flight.

### 1.5.5. Validity of medical certificate.

The pilot held a valid CMA (Aeronautical Medical Certificate).

## 1.6. Aircraft information.

The SN AR-2556020 aircraft, was a product manufactured by *Laviasa* in 1993, and registered in the Private Air Services Registration Category (TPP).

The aircraft's CVA (Certificate of Airworthiness Verification) was valid.

The records of the airframe, engine, and propeller logbooks were up to date.

The aircraft underwent its latest inspection ("50-hour" type) on 04<sup>th</sup> March 2022 on the premises of the *KKS Manutenção de Aeronaves Ltda.* (COM 2007-61/ANAC), in the municipality of *Formosa*, State of *Goiás*. It flew 30 hours and 6 minutes after the referred inspection.

No records were presented concerning any previous damage to the wings of the PT-OUB aircraft.

The aircraft had a Maximum Takeoff Weight (PMD) of 1,315 kg.

## 1.7. Meteorological information.

According to reports, the weather conditions were compatible with VFR flights.

## 1.8. Aids to navigation.

NIL.

## 1.9. Communications.

NIL.



### 1.10. Aerodrome information.

Not applicable.

### 1.16. Flight recorders.

Neither required not fitted.

### 1.17. Wreckage and impact information.

According to physical evidence found in the crash site, the aircraft was making a left-hand turn when it hit the ground (left-hand wing lower than the right-hand wing). The marks on the vegetation suggest that the aircraft was at a maximum vertical angle of about 45° during the descending trajectory, having slid about 30 m on the terrain, from the point of first impact until coming to a complete stop (Figure 4).



Figure 4 - Location of the wreckage.

Parts of the aircraft detached before it came to a stop in the location of concentration of the wreckage. Such parts were found approximately 200 m short of the final position of the aircraft, and were mainly from the painting of the wings, which were canvas (non-metallic). All the parts were arranged on the ground in a direction compatible with the trajectory traveled by the aircraft (Figure 5).



Figure 5 - Parts detached from the aircraft and were found approximately 200 m from the final position of the aircraft.

Excluding the small pieces of the wing tip, some paint chips from the wing and from the wing strut fairing, all the other parts of the aircraft remained concentrated.

## 1.18. Medical and pathological information.

### 1.18.1. Medical aspects.

NIL.

### 1.18.2. Ergonomic information.

NIL.

### 1.18.3. Psychological aspects.

There was no evidence that psychological issues might have affected the pilot's performance.

### 1.19. Fire.

There was no fire.

### 1.20. Survival aspects.

The pilot was conscious, and abandoned the aircraft on his own.

### 1.21. Tests and research.

The aircraft's *Differential Global Positioning System* (DGPS) equipment was collected by the Investigation Committee and analyzed at the CENIPA's LABDATA (Flight Recorders Data Readout Analysis Laboratory).

The said device was in operation during the accident flight, however, due to the characteristics of the system, it did not record the seconds prior to the impact. The recorded data was limited to the 600 m distance measured from the aircraft's final position.

Although the DGPS data corroborated the pilot's report regarding the horizontal trajectory on the ground, by comparing the flights prior to the accident flight, one was not able to obtain the vertical data (altitude/height) (Figure 6).

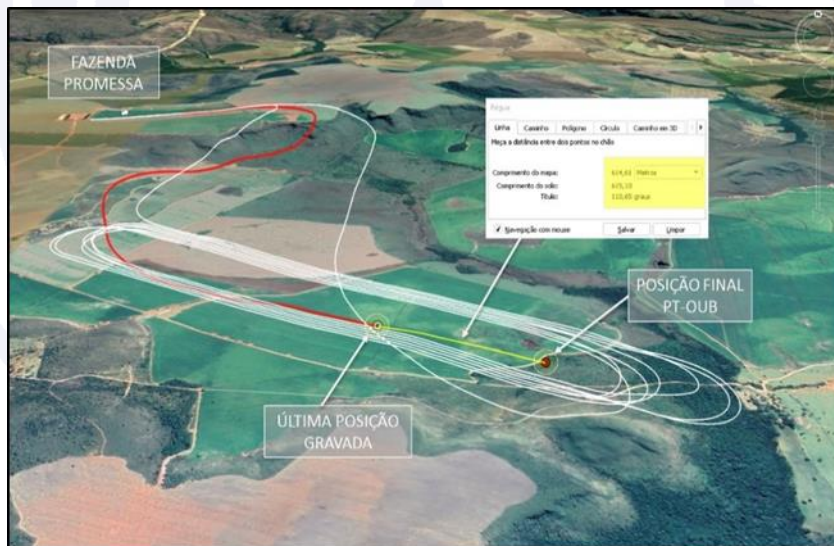


Figure 6 - In white, the flight trajectory prior to the accident and, in red, the trajectory of the occurrence. Source: adapted from Google Earth / DGPS.

The two struts of the right-hand and left-hand wings were sent to a laboratory for analysis of a possible structural failure (corrosion and/or overload) (Figure 7).



Figure 7 - Wing struts sent for analysis.

The analysis indicated that the fractures and dents affecting the wing struts of the PT-OUB aircraft were caused by an “overload mechanism” (*stress above the material’s resistance limit*) due to impacts against obstacles on the ground. No signs of corrosion at the wing/fuselage connection points were found, only signs of overload.

#### 1.22. Organizational and management information.

NIL.

#### 1.23. Operational information.

It was a crop-dusting flight.

The pilot reported that the aircraft was fueled with 75 liters of fuel, and had taken off with a weight of 1,220 kg (below its MTOW of 1,315 kg). The Investigation Committee concluded that the aircraft was operating within the weight and balance limits specified by the manufacturer.

The pilot reported that, after completing a pass for the application of agricultural pesticides, he would perform the “balloon” (repositioning turn) for a new pass. However, the PIC heard a noise coming from the left-hand side of the aircraft, probably from the wing, according to him.

After that, the airplane began to roll to the left, partially losing control in flight and progressively losing altitude, until eventually colliding with the ground.

#### 1.24. Additional information.

NIL.

#### 1.25. Useful or effective investigation techniques.

NIL.

### 2. ANALYSIS.

The aircraft was engaged in crop-dusting flight and was about to start a repositioning turn for a new pass, when the PIC heard a noise coming from the left-hand side of the aircraft, probably from the wing, in his own words.

From that moment on, the aircraft entered a left-hand turn, and there was a loss of control in flight, causing the plane to collide with the ground. Small parts of the wingtip, some paint chips from the wing and from the wing strut fairing were identified, which detached from the aircraft in a position short of the concentration of the wreckage, and were found approximately 200 m from the final position of the plane.



Since the collision with the ground occurred at a relatively low angle for a loss of control in flight, less than 45° and in the direction of travel, but in a left turn, one inferred that these parts had detached from the aircraft while it was still in flight. However, it was not possible to verify to what extent this detachment of components with the aircraft flying influenced its controllability and led to the loss of control in flight. The damage observed on the aircraft's propeller blades suggested that there had been no loss of engine power that could have affected the aircraft's performance. The transverse scratches on both blades indicated that propeller was rotating at the time of impact.

With regard to the deformation of the wing struts, the left-hand wing strut was bent in a "V" shape, in addition to being dented, and the right-hand wing strut sustained several dents, but maintained its original shape, which suggests that the aircraft touched the ground with the left wing lower in relation to the right-hand wing (rolling or turning to the left), consistent with what was observed on the ground.

The partial separation of the left wing upwards and backwards at the position closest to its root, but at approximately one-third of its length, and the damage observed on the right-hand side, corroborate that the aircraft touched the ground while rolling to the left.

The analysis of the wing struts indicated that the fractures and dents were caused by an "overload mechanism" (*stress above the material's resistance limit*), due to impacts against obstacles on the ground, and it was not possible to state whether the fractures and dents occurred in flight. The possibility of rupture due to corrosion at the strut/wing junction was ruled out.

Relatively to the subject of maintenance, the aircraft had approximately 4,700 hours logged in its airframe logbook, and its maintenance records were up to date. Considering the absence of corrosion, the inexistence of previous damage to the wing, and assuming that the flight hours logged corresponded to the aircraft's actual hours throughout its operational life, it was possible to affirm that there were no contributing factors related to maintenance failure and/or the possibility of the wing having reached its lifespan limit.

Therefore, it was not possible to identify any signs of inadequate preventative or corrective maintenance services performed on the aircraft that could have contributed to this occurrence.

On account of this, it was not possible to determine how the parts found approximately 200 m short of the final position of the accident aircraft separated from it.

The energy dissipated when the plane hit the ground caused substantial damage, but the aircraft cockpit and the pilot's integrity were preserved.

### **3. CONCLUSIONS.**

#### **3.1. Findings.**

- a) the pilot held a valid CMA (Aeronautical Medical Certificate);
- b) the pilot held valid MNTE and PAGA ratings;
- c) the pilot was qualified and had experience in the type of flight;
- d) the aircraft had a valid CVA (Certificate of Airworthiness Verification);
- e) the aircraft was within the prescribed weight and balance limits;
- f) the records of the airframe, engine, and propeller logbooks were up to date;
- g) the reported weather conditions were favorable for the conduction of the flight;
- h) the aircraft was about to perform a repositioning turn on a crop-dusting flight;

- i) the PIC reported having heard a noise coming from the left-hand side of the aircraft, probably from the wing;
- j) the aircraft rolled to the left;
- k) the aircraft collided with the terrain;
- l) the fractures and dents were caused by overload mechanisms due to impacts against obstacles on the ground;
- m) the aircraft sustained substantial damage; and
- n) the pilot was not injured.

### **3.2. Contributing factors.**

- **Other – undetermined.**

Although it was not possible to verify the extent to which the inflight separation of components influenced the controllability of the aircraft, it is possible that such a condition contributed to the loss of control in flight.

### **4. SAFETY RECOMMENDATIONS**

None.

### **5. CORRECTIVE OR PREVENTATIVE ACTION ALREADY TAKEN.**

None.

On June 25th, 2024.