COMANDO DA AERONÁUTICA <u>CENTRO DE INVESTIGAÇÃO E PREVENÇÃO DE</u> <u>ACIDENTES AERONÁUTICOS</u>



FINAL REPORT A - 035/CENIPA/2019

OCCURRENCE: AIRCRAFT: MODEL: DATE: ACCIDENT PR-ENM T182T 23FEB2019



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 taking into account 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 different 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 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. Taking into account 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 the Final Report of the 23FEB2019 accident with the 58 aircraft model, registration PR-ENM. The accident was classified as "[SCF-PP] System/Component Failure or Malfunction Powerplant – Engine Failure in Flight".

During the flight en route, after declaring an emergency, the pilot made a forced landing on a dense forest area, in the 167° radial, 60nm away from the municipality of Jacareacanga - PA.

The aircraft had substantial damage.

The pilot and the passenger suffered fatal injuries.

An Accredited Representative of the National Transportation Safety Board (NTSB) - USA, (State where the aircraft was designed) was designated for participation in the investigation.

CONTENTS

GLOSSARY OF TECHNICAL TERMS AND ABBREVIATIONS
1. FACTUAL INFORMATION
1.1 History of the flight
1.2 Injuries to persons
1.3 Damage to the aircraft
1.4 Other damage7
1.5 Personnel information7
1.5.1 Crew's flight experience7
1.5.2 Personnel training7
1.5.3 Category of licenses and validity of certificates
1.5.4 Qualification and flight experience7
1.5.5 Validity of medical certificate7
1.6 Aircraft information7
1.7 Meteorological information
1.8 Aids to navigation
1.9 Communications
1.10 Aerodrome information
1.11 Flight recorders
1.12 Wreckage and impact information
1.13 Medical and pathological information
1.13.1 Medical aspects9
1.13.2 Ergonomic information
1.13.3 Psychological aspects10
1.14 Fire
1.15 Survival aspects10
1.16 Tests and research
1.17 Organizational and management information10
1.18 Operational information10
1.19 Additional information
1.20 Useful or effective investigation techniques10
2. ANALYSIS
3. CONCLUSIONS
3.1 Facts
3.2 Contributing factors
4. SAFETY RECOMMENDATION12
5. CORRECTIVE OR PREVENTATIVE ACTION ALREADY TAKEN

GLOSSARY OF TECHNICAL TERMS AND ABBREVIATIONS

ACC-AZ	Amazon Area Control Center			
ANAC	Brazil's National Civil Aviation Agency			
AVGAS	Aviation Gasoline			
CA	Airworthiness Certificate			
CENIPA	Aeronautical Accident Investigation and Prevention Center			
CG	Center of Gravity			
CIV	Pilot's Flight Logbook			
СМ	Registration Certificate			
CMA	Aeronautical Medical Certificate			
CVDR	Cockpit Voice and Data Recorder			
CVR	Cockpit Voice Recorder			
DA	Airworthiness Directive			
ELT	Emergency Locator Transmitter			
FAB	Brazilian Air Force			
IAM	Annual Maintenance Inspection			
MNTE	Airplane Single Engine Land Rating			
NTSB	National Transportation Safety Board (USA)			
OM	Maintenance Organization			
PPR	Private Pilot License – Airplane			
SBAT	ICAO Location Designator – Piloto Osvaldo Marques Dias Airport, Alta			
SBEK	Floresta - MT ICAO Location Designator – Jacareacanga Aerodrome - PA			
SIPAER	Aeronautical Accident Investigation and Prevention System			
TPP	Registration Category of Private Service - Aircraft			
UTC	Universal Time Coordinated			

1. FACTUAL INFORMATION.

	Model:	T182T	Operator:	
Aircraft	Registration:	PR-ENM	Private	
	Manufacturer:	Cessna Aircraft		
Occurrence	Date/time:	23FEB2019 – 1546 UTC	Type(s):	
	Location: Out of the Aerodrome		"[SCF-PP] System/Component Failure or Malfunction Powerplant"	
	Lat. 07°04'36"S Long. 057°17'42"W		Subtype(s):	
	Municipality –	State: Jacareacanga – PA	Engine Failure in Flight	

1.1 History of the flight.

The aircraft took off from the Piloto Osvaldo Marques Dias Aerodrome (SBAT), Alta Floresta - MT, to the Jacareacanga Aerodrome (SBEK) - PA, at about 1440 (UTC), for a private flight en route, with a pilot and a passenger on board.

During the flight en route, after declaring an emergency, the pilot made a forced landing on a dense forest area, in the 167° radial, 60nm away from the municipality of Jacareacanga - PA.



Figure 1 - Aerial view of the aircraft at the accident site.

The aircraft had substantial damage.

The pilot and the passenger suffered fatal injuries.

1.2 Injuries to persons.

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

1.3 Damage to the aircraft.

The aircraft had substantial damage to the engine, the propeller assembly, the wings, the vertical and horizontal stabilizers, the fuselage, the cabin, the rudder and the elevator.

Fractures were found in the structure of the nose landing gear and the main train.

A-035/CENIPA/2019

PR-ENM 23FEB2019



Figure 2 - View of the aircraft at the accident site.

1.4 Other damage.

None.

1.5 Personnel information.

1.5.1 Crew's flight experience.

Flight Hours	Pilot
Total	1.288:45
Total in the last 30 days	04:25
Total in the last 24 hours	Unknown
In this type of aircraft	934:45
In this type in the last 30 days	04:25
In this type in the last 24 hours	Unknown

N.B.: The data related to the flown hours were obtained through the records on the pilot's CIV.

1.5.2 Personnel training.

The pilot took the PPR course at the São Paulo Aeroclub - SP, in 2007.

1.5.3 Category of licenses and validity of certificates.

The pilot had the PPR License and had valid MNTE and IFRA Ratings.

1.5.4 Qualification and flight experience.

The pilot was qualified and had experience in the kind of flight.

1.5.5 Validity of medical certificate.

The pilot had valid CMA.

1.6 Aircraft information.

The aircraft, serial number T18208546, was manufactured by Cessna Aircraft, in 2006, and was registered in the TPP category.

The aircraft had valid Airworthiness Certificate (CA).

The airframe, engine, and propeller logbook records were updated.

A-035/CENIPA/2019

The last inspection of the aircraft, the "200 hours" type, was performed on 20FEB2019, by the maintenance organization Baburichi Fly Air Advisory Ltd., in Americana - SP, having flown about 10 hours after the inspection.

The last inspection of the aircraft, the "IAM" type, was performed on 04MAY2018, by the maintenance organization Baburichi Fly Air Advisory Ltd., in Americana - SP, having flown about 139,5 hours after the inspection.

1.7 Meteorological information.

The presence of adverse weather formations was not reported by the pilot.

The conditions were favorable for the visual flight.

The SIGWX of the accident region, generated at 1447 (UTC), valid until 24FEB2019, at 0600 (UTC), illustrated the presence of isolated Cumulonimbus, hidden in layers of other clouds, based on 3,000ft and unknown top.



1.8 Aids to navigation.

Nil.

1.9 Communications.

According to the transcripts of the communication audios between a FAB aircraft and the control agency, it was found that the PR-ENM made a call on the free frequency.

In order to support the analysis of the sequence of events that preceded the forced landing of the aircraft, the Investigation Team highlighted some transmissions that can help in understanding the dynamics of the accident. To record the times described in this field, the Coordinated Universal Time (UTC) was used as a reference.

At 15h22min, the PR-ENM made a call on the free frequency, declaring MAYDAY, stating that it was 40 minutes from SBEK, going down from 6,500ft to 3,000ft, with engine failure.

At 15h23min, the FAB aircraft made contact with the control agency and passed on the PR-ENM message.

At 15h24min, the control agency contacted the Brazilian Air Force (FAB) helicopter, requesting to keep in touch with the PR-ENM on the free frequency and inform that the SALVAERO would be activated.

A-035/CENIPA/2019

At 15h32min, after several call attempts, the FAB aircraft reported to the control agency that the PR-ENM no longer responded on the free frequency.

The Search and Rescue procedures were initiated and, through the signals emitted by the Emergency Locator Transmitter (ELT), the aircraft had been found.

1.10 Aerodrome information.

The forced landing occurred out of the Aerodrome, in the Amazon rainforest, about 60nm, in the 167° radial of SBEK (Figure 5).



Figure 5 - PR-ENM route. Source: adapted from Google Maps.

1.11 Flight recorders.

Neither required nor installed.

1.12 Wreckage and impact information.

The first impact was against local vegetation, with no trace of a previous collision. The distribution of the wreckage was the concentrated type. The aircraft was turned on its back after the stop (Figure 2).

Evidence of fractures found in the aircraft's fuselage is compatible with impact against large trees, present around the aircraft.

1.13 Medical and pathological information.

1.13.1 Medical aspects.

No evidence was found that problems of physiological nature could have affected the flight crew performance.

1.13.2 Ergonomic information.

Nil.

1.13.3 Psychological aspects.

Nil.

1.14 Fire.

There was no fire.

1.15 Survival aspects.

The pilot and passenger were found inside the aircraft. There were no survivors.

1.16 Tests and research.

The supply company *Pioneiro Combustíveis* was asked to provide the result of the last fuel test. This test, performed on 22FEB2019, the day before the aircraft was refueled, showed no changes.

1.17 Organizational and management information.

Nil.

1.18 Operational information.

The aircraft was within the weight and balance limits specified by the manufacturer.

The aircraft was refueled with 179 liters or 47 US Gal of AVGAS, enough to carry out the stage between SBAT and SBEK, which had an estimated duration of 1 hour and 50 minutes.

According to information from third parties, the aircraft had as final destiny the United States of America (USA).

1.19 Additional information.

The Law n° 12,970, of 08MAY2014, amended Chapter VI of Title III and art. 302 and revoked articles 89, 91 and 92 of Law n° 7,565, of 19DEC1986 - Brazilian Aeronautical Code, to deal with investigations of the SIPAER and access to the aircraft wreckage.

Art. 88-Q. The duty to remove aircraft involved in an accident, the debris and transported goods, anywhere, will be the operator of the aircraft, who will bear the resulting expenses.

§ 1st At public Aerodromes, if the operator does not provide, in do time, the removal of the aircraft or its wreckage, it will be incumbent upon the Aerodrome management to do so, imputing to it the indemnity of the expenses.

2nd In order to protect the environment, safety, health and the preservation of public and private property, the operator of the crashed aircraft must provide and pay for the cleaning of the place, goods and wreckage when, by the place or state in which if found, they cannot be removed.

§ 3rd The sale of the wreckage, parts, components and engines will be prohibited before they have been released by the investigating authority Sipaer and, if any, by the person responsible for the police investigation, after observing the other legal and regulatory requirements.

1.20 Useful or effective investigation techniques.

Nil.

2. ANALYSIS.

It was a private flight en route between SBAT and SBEK, with a crewmember and a passenger on board.

During the flight en route, with about an hour of flight, the pilot declared an emergency and made a forced landing in an area of dense forest.

At 15h22min, the PR-ENM made a call on the free frequency, declaring MAYDAY with engine failure and descending to the ground, reporting to be 40 minutes from SBEK.

After the loss of contact with the aircraft, the Search and Rescue procedures were initiated and, through the signals emitted by the Emergency Locator Transmitter (ELT), the aircraft was located, in the 167° radial, about 60nm from SBEK.

The presence of adverse weather formations was not reported by the pilot.

The aircraft had valid IAM until 04MAY2019 and the Airworthiness Certificate valid until 23JUN2022.

The last inspection of the aircraft, of the "200 hours" type, was carried out on 20FEB2019, by the maintenance organization Baburichi Fly Air Advisory Ltd., in Americana -SP, having flown about 10 hours after the inspection.

According to the refueling receipt that took place on the day of the accident, there is no evidence that a fuel starvation may have occurred, since the plane was filled with 179 liters of AVGAS, sufficient to perform the planned leg.

In addition, it was possible to obtain the result of the fuel test carried out the day before the accident, which showed a result without changes. This reduces the likelihood that the quality of the fuel may have contributed to the occurrence.

That said, and considering that the pilot reported engine failure in flight, the most likely hypothesis is that a problem occurred in some component of the powerplant, which made it impossible to maintain its operational performance in flight and, consequently, in the cruise flight.

However, in order to perform the relevant examinations, the Investigation Team should have had access to parts of the aircraft, whose responsibility for having them removed from the accident site belonged to the aircraft operator.

The Brazilian Aeronautical Code, Law n° 7,565, of 19DEC1986, amended by Law n°12,970, from 8MAY2014, which dealt with investigations by the SIPAER and access to aircraft wreckage established that:

Art. 88-Q. The duty to remove aircraft involved in an accident, the debris and transported goods, anywhere, will be the operator of the aircraft, who will bear the resulting expenses.

Thus, it was not possible to further investigate the engine and aircraft components, in order to validate the most likely hypothesis of engine malfunction, since there was no removal of the wreckage from the accident site.

3. CONCLUSIONS.

3.1 Facts.

- a) the pilot had valid CMA;
- b) the pilot had valid MNTE Rating;
- c) the pilot was qualified and had experience in the kind of flight;
- d) the aircraft had valid CA;
- e) the aircraft was within the weight and balance limits specified;
- f) the aircraft was filled with 179 liters of fuel on the day of the accident;
- g) the airframe, engine and propeller logbook records were updated;
- h) the weather conditions were favorable for the flight;

i) the aircraft had a valid IAM;

- j) the pilot reported MAYDAY and engine failure in flight;
- k) the aircraft made a forced landing, in dense forest, 60nm away from Jacareacanga - PA;
- I) the aircraft was not removed from the accident site, preventing further investigation;
- m) the aircraft had substantial damage; and
- n) the pilot and the passenger suffered fatal injuries.

3.2 Contributing factors.

Undetermined.

4. SAFETY RECOMMENDATION.

A proposal of an accident investigation authority based on information derived from an investigation, made with the intention of preventing accidents or incidents and which in no case has the purpose of creating a presumption of blame or liability for an accident or incident. In addition to safety recommendations arising from accident and incident investigations, safety recommendations may result from diverse sources, including safety studies.

In consonance with the Law n°7565/1986, recommendations are made solely for the benefit of the air activity operational safety, and shall be treated as established in the NSCA 3-13 "Protocols for the Investigation of Civil Aviation Aeronautical Occurrences conducted by the Brazilian State".

Recommendations issued at the publication of this report:

Nil.

5. CORRECTIVE OR PREVENTATIVE ACTION ALREADY TAKEN.

None.

On March 29th, 2021.