

COMANDO DA AERONÁUTICA
CENTRO DE INVESTIGAÇÃO E PREVENÇÃO DE
ACIDENTES AERONÁUTICOS



FINAL REPORT
A - 064/CENIPA/2021

OCCURRENCE:	ACCIDENT
AIRCRAFT:	PR-FPR
MODEL:	210N
DATE:	06MAY2021



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 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. 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 06MAY2021 accident with the 210N aircraft model, registration PR-FPR. The accident was classified as “[LALT] Low Altitude Operations”.

During a low-altitude flight near São Raimundo Mining, Itaituba - PA the aircraft crashed into the ground.

It was found that the plane was being flown intentionally close to the ground at the time of the collision.

The aircraft was destroyed.

The pilot and two passengers suffered fatal injuries.

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



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GLOSSARY OF TECHNICAL TERMS AND ABBREVIATIONS

ANAC	Brazil's National Civil Aviation Agency
CA	Airworthiness Certificate
CENIPA	Aeronautical Accident Investigation and Prevention Center
CIV	Pilot's Flight Logbook
CMA	Aeronautical Medical Certificate
CVA	Airworthiness Verification Certificate
DECEA	Airspace Control Department
ICA	Aeronautics Command Instruction
MNTE	Airplane Single Engine Land Rating
NTSB	National Transportation Safety Board (USA)
PCM	Commercial Pilot License - Airplane
PIC	Pilot in Command
PLA	Airline Pilot License – Airplane
PPR	Private Pilot License – Airplane
RBAC	Brazilian Civil Aviation Regulation
SIPAER	Aeronautical Accident Investigation and Prevention System
TPP	Registration Category of Private Service
UTC	Universal Time Coordinated
VFR	Visual Flight Rules

1. FACTUAL INFORMATION.

Aircraft	Model: 210N Registration: PR-FPR Manufacturer: Cessna Aircraft	Operator: Private
Occurrence	Date/time: 06MAY2021 - 2035 UTC Location: São Raimundo Mining Lat. 07°38'10"S Long. 056°44'17"W Municipality – State: Itaituba – PA	Type(s): "[LALT] Low Altitude Operations" Subtype(s): Nil

1.1 History of the flight.

The aircraft took off from an unregistered runway at São Raimundo Mining, Itaituba - PA, to an uninformed mining site, at 2030 (UTC), in order to carry out a cargo and passenger transport flight with a pilot and two passengers on board.

After the take-off, the plane flew at low altitude over the São Raimundo Mining area and crashed into the ground after making a right turn.

The aircraft was destroyed.

The crewmember and two passengers suffered fatal injuries.

1.2 Injuries to persons.

Injuries	Crew	Passengers	Others
Fatal	1	2	-
Serious	-	-	-
Minor	-	-	-
None	-	-	-

1.3 Damage to the aircraft.

The aircraft was destroyed.

1.4 Other damage.

None.

1.5 Personnel information.

1.5.1 Crew's flight experience.

Flight Hours	Pilot
Total	40:36
Total in the last 30 days	Unknown
Total in the last 24 hours	Unknown
In this type of aircraft	Unknown
In this type in the last 30 days	Unknown
In this type in the last 24 hours	Unknown

N.B.: The data relating to the flown hours were obtained through the pilot's digital CIV records, available at the ANAC's SACI.

1.5.2 Personnel training.

The PIC took the PPR course at the Pernambuco Aeroclub - PE, in 2019.

1.5.3 Category of licenses and validity of certificates.

The PIC had the PPR License and had a valid MNTE Rating.

According to the RBAC No. 61, the prerogatives of a Private Pilot License holder were:

61.85 Prerogatives of the private pilot license holder and conditions that must be observed in order to exercise them:

(a) The prerogatives of a private pilot license holder are limited to acting, without remuneration, as pilot-in-command or second-in-command of an aircraft of the category appropriate to his license and that performs unpaid flights and without any type of commercial use.

1.5.4 Qualification and flight experience.

The digital CIV records showed that the pilot had only 17 hours and 42 minutes of flight time as a PIC.

It was not possible to obtain other data regarding his flight experience.

It was not possible to determine whether the pilot was qualified to perform the flight.

1.5.5 Validity of medical certificate.

The pilot had valid CMA.

1.6 Aircraft information.

The aircraft, serial number 2106447, was manufactured by Cessna Aircraft in 198, and was enrolled in the TPP Category.

The aircraft CVA was valid.

The investigators did not have access to the plane's airframe, engine and propeller logs. Thus, it was not possible to verify that the logbook records were updated.

The last inspection of the aircraft, the "200 hours and CVA" type, was carried out on 20NOV2020 by the maintenance organization Ramos Maintenance Aeronáutica Ltd., in Goiânia - GO.

It was not possible to establish the number of hours flown after the inspection.

1.7 Meteorological information.

From footage taken by third parties at the time of the accident, it was concluded that the conditions were favorable for the visual flight.

1.8 Aids to navigation.

Nil.

1.9 Communications.

Nil.

1.10 Aerodrome information.

The unregistered runway at the São Raimundo Mining was a dirt runway, with 30/12 thresholds, dimensions of 1,480 x 10 m, with an elevation of 840 ft.

1.11 Flight recorders.

Neither required nor installed.

1.12 Wreckage and impact information.

The first impact occurred approximately 650 meters from threshold 30, in a pitch up attitude (approximately 10°) and with leveled wings. There was no evidence of previous impact.

There was a trail of approximately 30 meters, where small paint chips and fragments of the aircraft's fuselage were found, indicating that it dragged on vegetation/ground.

The second impact occurred with a lot of energy against a pile of sand. At that moment, the plane broke apart, and the engine was thrown forward.

The fuselage was concentrated at the site of the third and final impact.

The distribution of the wreckage was linear.

The moments before the plane crashed into the ground were observed and filmed by local observers.

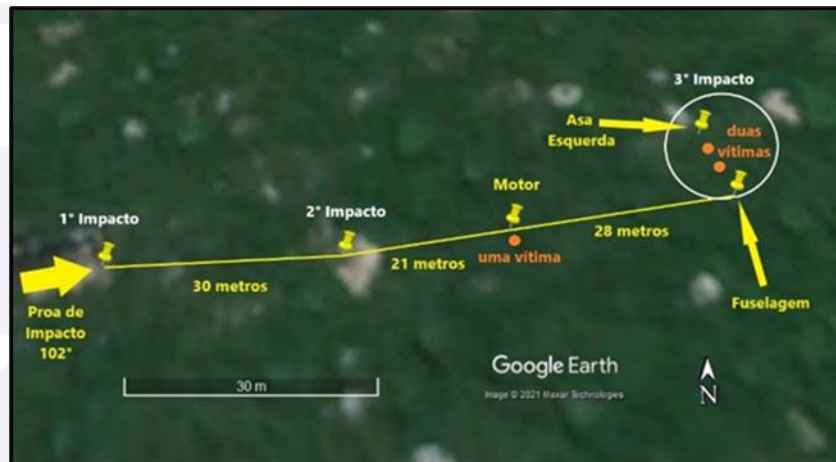


Figure 1 - Sketch of the occurrence. Source: Adapted from Google Earth.

After the third impact, the aircraft caught fire and was consumed by it. The degree of destruction and carbonization made a more accurate examination of its equipment and instruments difficult.

1.13 Medical and pathological information.

1.13.1 Medical aspects.

Nil.

1.13.2 Ergonomic information.

Nil.

1.13.3 Psychological aspects.

The PIC started his experience as a private pilot in 2019. Prior to that, he worked in the ground operational support area at an Airline.

During the investigation, information was obtained that the pilot had been in Novo Progresso - PA for a year, looking for opportunities and experiences, having worked as an aircraft and apron maintenance assistant without formal employment.

According to reports, during this period, he would have accumulated about 300 hours of freelance flying in flights in the region.

According to the interviewees, although he had the PPR License and the MNTE Rating, he did not fly solo in the locality, being always accompanied by other pilots.

These people reported that his expectation was to obtain the PCM license and, later, the PLA license to work in the Airline where he had previously worked.

The PIC was described as an intelligent, humble, communicative person with good social interaction, possessing a centered operational profile, obedient and attentive to commands, in addition to being motivated to work in aviation.

Possessing good fluency in English, he intended to take the ANAC's English language proficiency exam for civil aviation professionals.

On the day of the accident, the pilot appeared to be well and happy, and no abnormal behavior was observed.

One of the passengers on board, who also held a PPR license, was the son of the aircraft owner. However, it was not possible to collect any information about his professional profile.

1.14 Fire.

The aircraft was destroyed by the fire that followed the last impact..

1.15 Survival aspects.

There were no survivors.

1.16 Tests and research.

During the field investigation, it was observed that at least one propeller blade presented forward deformations, compatible with an impact in which the engine developed power at the moment of collision with the ground (Figure 2).



Figure 2 - Image of the PR-FPR propeller assembly.

The deformations observed in the wreckage indicated the occurrence of impacts with high energy.

1.17 Organizational and management information.

The aircraft was privately owned, and was used for the purpose of transporting material between the mines.

1.18 Operational information.

It was a flight for the transport of cargo and personnel, which should be conducted under the requirements established by the RBAC nº 91, Amendment 02, which established the General Operating Requirements for Civil Aircraft.

According to the information provided to investigators, the aircraft was carrying, in addition to the two passengers, supplies for mining. However, it was not possible to obtain data on the amount of cargo nor its distribution in the aircraft cabin.

Thus, it was not possible to establish whether the aircraft was within the weight and balance limits specified by the manufacturer.

Images taken by third parties shortly after the accident, showed that there was a gas cylinder near the wreckage. This item was not found by investigators during the field investigation, indicating that the wreck site had been altered before investigators' arrival.

According to information gathered in the course of the investigation, the other pilot, who was on board the aircraft as a passenger, used to take the controls at certain times. He often accompanied the PIC to familiarize him with the region.

Although he had the PPR license, his MNTTE Rating expired in February 2021, and his CMA expired on 29MAR2021. It was not possible to obtain information about this pilot's flight experience as there were no records in his digital CIV.

Through the footage of the accident made by observers, it was possible to notice that the aircraft was performing a flight at low altitude, with turns to the right, in the moments before the collision with the ground.



Figure 3 - Image of the flight extracted from the video provided by observers.

Then, after leveling the wings, the plane “sank” and disappeared behind the relief.

The audio of this footage describes the expected trajectory of the low pass, mentioning identifiable references in the footage when the aircraft disappears from the video behind the terrain, such as “it will lift up ahead, near that little house” indicating that the observer was used to seeing this type of flight (Figure 4).



Figure 4 - Image of the flight extracted from the video provided by observers, showing the mentioned reference and the explosion after the plane hit the ground.

According to the reports collected, flying at low altitudes in the mining area was a common practice.

1.19 Additional information.

The RBAC No. 91, Amendment 02, provided, in its section 91.102 General Rules, letter (d), the following:

91.102 General Rules

[...]

(d) It is only permitted to use a Brazilian Aerodrome if it is registered and the operator determines that this Aerodrome is suitable for the type of aircraft involved and for the proposed operation.

On the responsibility and authority of the Pilot in Command, the same RBAC established, in its section 91.3 Responsibility and Authority of the PIC, letter (a), the following:

91.3 Responsibility and authority of the pilot in command

(a) The pilot-in-command of an aircraft has final authority and responsibility for the operation and safety of the flight.

The ICA No. 100-12, which dealt with the Rules of the Air, established, in its paragraph 5 Visual Flight Rules, item 5.1.4, that:

5 VISUAL FLIGHT RULES

[...]

5.1.4 Except for take-off and landing operations, the VFR flight will not be performed:

a) over cities, towns, inhabited places, or over groups of people outdoors at a height of less than 300m (1,000ft) above the highest obstacle within a radius of 600m around the aircraft; and

b) in places not mentioned in the previous paragraph, at a height of less than 150 m (500 ft) above the ground or water.

1.20 Useful or effective investigation techniques.

Nil.

2. ANALYSIS.

It was a flight for the transport of cargo and personnel, which should be conducted under the RBAC 91, which established the General Operating Requirements for Civil Aircraft.

Examinations conducted at the crash site led investigators to conclude that the aircraft hit the ground with high energy. The absence of previous impacts and the trail of paint chips and fuselage fragments observed, indicated that at the time of the first impact, the plane was practically leveled, suggesting that it had reached the ground in controlled flight.

Although the degree of destruction and carbonization prevented a closer examination of the aircraft's equipment and instruments, the flight trajectory observed in the footage presented to the investigators, the sequence of impacts in an apparently controlled attitude, as well as the deformations observed in one of the propeller blades, which indicated that the engine was developing power at the time of the accident, led to the conclusion that there was no contribution of failures or equipment malfunctions to this occurrence.

On the other hand, the investigation elements mentioned above point to an inadequate assessment of the aircraft's maneuverability and its responses during the "sink" that preceded the first collision with the ground, as well as the risks involved in the intentional operation at speed, close to the ground.

In this context, it is likely that an inadequate or late application of the flight controls allowed the first touch of the plane to the ground and precipitated a loss of control that resulted in the other collisions, which culminated in the destruction of the aircraft.

Based on the analysis of the accident video made from the ground, in which the observer demonstrated that he knew the pattern of the maneuver that resulted in this accident, given that he knew the place where the low pass would be performed, and where the aircraft would gain height after disappearing behind the relief, as well as in the information that low flights were common in the mining area, it was inferred that there was, in the group of professionals who operated there, a set of values and practices that led to actions and omissions incompatible with flight safety.

The study of the dynamics of this accident revealed that the requirements established in the RBAC 91 for the operation of civil aircraft as well as the height limitations established for visual flight in the ICA 100-12, were not considered.

Such actions reflected inappropriate attitudes and postures such as complacency, overconfidence, exhibitionism, impulsiveness, and non-compliance with regulations and procedures intended to guarantee the operational safety of air operations.

Despite the information that the passenger, who was also a pilot, used to take the controls at certain times, despite having his license and CMA expired, it was not possible to determine who was flying the aircraft at the time of the accident. However, if this situation has occurred, this fact does not exempt the PIC from its responsibilities established in RBAC 91.

Finally, the operation in disagreement with the aeronautical legislation in force may imply safety levels below the minimum acceptable established by the Brazilian State.

By failing to meet the minimum safety levels defined by the Brazilian State, guaranteed through compliance with the RBAC, latent unsafe conditions can be created, which must be eliminated or mitigated through compliance with the regulation.

3. CONCLUSIONS.

3.1 Facts.

- a) the PIC had a valid CMA;
- b) the PIC had a valid MNTE Rating;
- c) it was not possible to determine whether the PIC was qualified to perform the flight;
- d) the aircraft had a valid CVA;
- e) it was not possible to establish whether the aircraft was within the weight and balance limits;
- f) it was not possible to verify whether the airframe, engine and propeller logbook records were updated;
- g) from footage taken by third parties at the time of the accident, it was concluded that the weather conditions were favorable for the visual flight;
- h) after the take-off, the plane flew at low altitude over the São Raimundo Mining area and crashed into the ground after making a right turn;
- i) the moments that preceded the collision of the plane with the ground were observed and filmed by local observers;
- j) the first impact occurred at approximately 650 meters from threshold 30, in a pitch up attitude (approximately 10°) and with leveled wings;

- k) at least one propeller blade presented forward deformations, compatible with an impact in which the engine developed power at the moment of collision with the ground;
- l) one of the passengers on board the aircraft had a PPR License, but his MNTE Rating and his CMA had expired;
- m) it was not possible to determine who actually acted in command at the time of the accident;
- n) the operation of a Brazilian civil aircraft from an unregistered Aerodrome characterized the non-compliance with the requirements established in the RBAC 91;
- o) the aircraft was destroyed; and
- p) all occupants suffered fatal injuries.

3.2 Contributing factors.

- **Control skills – undetermined.**

It is likely that an improper or late application of the flight controls allowed the first contact of the aircraft against the ground and precipitated a loss of control that resulted in the other collisions, which culminated in the destruction of the aircraft.

- **Attitude – a contributor.**

The operation was carried out in disagreement with the requirements established in the RBAC 91 without an adequate assessment of the reflexes on flight safety, non-compliance with regulations, and the impacts of the performed maneuvers. Such conduct reflected inappropriate attitudes and postures such as complacency, overconfidence, exhibitionism, and impulsiveness that contributed to this occurrence.

- **Work-group culture – a contributor.**

Based on the analysis of the accident video made from the ground, in which the observer demonstrated knowledge of the pattern of the maneuver that resulted in this accident, as well as on the information that low flights were common in the mining area, it was inferred that there were, in the group of professionals who worked there, a set of values and practices that led to actions and omissions incompatible with flight safety.

- **Piloting judgment – a contributor.**

The investigation elements collected, which indicated that the plane hit the ground in controlled flight, pointed to an inadequate assessment of the aircraft's maneuverability and its responses during the "sink" that preceded the first collision with the ground, as well as the risks involved in the intentional operation, at speed, close to the ground.

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”.

Nil.

5. CORRECTIVE OR PREVENTATIVE ACTION ALREADY TAKEN.

None.

On November 3th, 2022.

