COMANDO DA AERONÁUTICA

CENTRO DE INVESTIGAÇÃO E PREVENÇÃO DE ACIDENTES AERONÁUTICOS

FINAL REPORT
A - 020/CENIPA/2018

OCCURRENCE:	**ACCIDENT**
AIRCRAFT:	**PT-AVO**
MODEL:	**F35**
DATE:	**07FEB2018**

NOTICE

According to the Law nº 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 nº 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 07FEB2018 accident with the F35 aircraft, registration PT-AVO. The accident was classified as “[LOC-I] Loss of Control in Flight”.

Shortly after the takeoff from an unregistered runway, the aircraft took an aggressive climb attitude and turned left, crashing into the ground at the margins of a water reservoir, 280 meters away from threshold 09 of that runway.

The aircraft was destroyed.

The pilot and the two passengers died at the crash site.

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

CONTENTS

GLOSSARY OF TECHNICAL TERMS AND ABBREVIATIONS

ANAC	Brazil's National Civil Aviation Agency
CA	Airworthiness Certificate
CENIPA	Aeronautical Accident Investigation and Prevention Center
CG	Center of Gravity
CIV	Pilot's Flight Logbook
CMA	Aeronautical Medical Certificate
IAM	Annual Maintenance Inspection
MLTE	Airplane Multi Engine Land Rating
MNTE	Airplane Single Engine Land Rating
NTSB	National Transportation Safety Board (USA)
PCM	Commercial Pilot License – Airplane
PPR	Private Pilot License – Airplane
RBHA	Brazilian Aeronautical Certification Regulation
RCA	Airworthiness Condition Report
RS	Safety Recommendation
SERIPA 1	First Regional Aeronautical Accident Investigation and Prevention Service
SIID	ICAO Location Designator – Crepurizão Aerodrome, Itaituba - PA
SIPAER	Aeronautical Accident Investigation and Prevention System
SNMD	ICAO Location Designator – Mundico Coelho Aerodrome, Itaituba - PA
SWSI	ICAO Location Designator – Presidente João Batista Figueiredo Aerodrome, Sinop - MT
TPP	Registration Category of Private Service - Aircraft
UTC	Universal Time Coordinated
VFR	Visual Flight Rules

1. FACTUAL INFORMATION.

Aircraft	**Model:** F35 **Registration:** PT-AVO **Manufacturer:** Beech Aircraft	**Operator:** Private
Occurrence	**Date/time:** 07FEB2018 - 1530 UTC **Location:** Crepurizão **Lat.** 06°49'25"S **Long.** 056°50'54"W **Municipality – State:** Itaituba – PA	**Type(s):** [LOC-I] Loss of Control in Flight **Subtype(s):** Nil

1.1 History of the flight.

The aircraft took off from the unregistered runway of the Crepurizão community, Itaituba - PA, to the Presidente João Batista Figueiredo (SWSI), Sinop - MT Aerodrome, at about 1530 (UTC), in order to transport cargo and personnel with a pilot and two passengers on board.

According to reports, soon after leaving the ground, the aircraft took an aggressive climb attitude and turned left losing altitude until colliding against the ground, at the margins of a water reservoir, at about 280 meters away from the threshold of the Crepurizão runway 09.

The aircraft was destroyed.

Pilot 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	Unknown
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 related to the flown hours could not be obtained.

1.5.2 Personnel training.

The pilot took the PPR course in 1975.

1.5.3 Category of licenses and validity of certificates.

The pilot had the PCM License and valid MLTE and MNTE Ratings.

1.5.4 Qualification and flight experience.

The pilot's CMA was overdue since 05NOV2017.

1.5.5 Validity of medical certificate.

The aircraft, serial number D-4328, was manufactured by Beech Aircraft, in 1955 and it was registered in the TPP category.

The aircraft had valid Airworthiness Certificate (CA).

The airframe, engine and propeller logbooks were not given to the Investigators.

Part of the airframe logbook cover was found burned in the middle of the wreckage.

The aircraft flight logbook was not found and no copies of the flight records were made available.

The last inspection of the aircraft, the "50hours" type, was carried out on 30MAR2017 by the CONAL *Construtora Nacional de Aviões* LTD. maintenance organization, in Sorocaba – SP. It was not possible to determine the flown hours after this inspection.

1.6 Aircraft information.

According to the ANAC records, the aircraft IAM was valid until 30MAR2018.

A RCA for the revalidation of the Airworthiness Certificate, issued on 30MAR2017, was also presented to the Investigators by the CONAL.

1.7 Meteorological information.

According to reports, the weather conditions were favorable for the visual flight.

1.8 Aids to navigation.

Nil.

1.9 Communications.

Nil.

1.10 Aerodrome information.

The Aerodrome had its register canceled in 2007. Its location designator was SIID.

The runway was made of gravel, with thresholds 09/27, dimensions 700m x 18m, with elevation of 695 feet.

There were no physical demarcations or barriers that could prevent access to the runway. Thus, the movement of people, animals and vehicles, especially motorcycles, in the "operational area" was common.

According to reports, the runway was used by several operators in the region. There was even an "operation room", which had a person who operated a radio station on the unauthorized 123.50 MHz frequency.

The Mundico Coelho Aerodrome (SNMD) was about 2,000 meters away from the Crepurizão runway.

1.11 Flight recorders.

Neither required nor installed.

1.12 Wreckage and impact information.

The aircraft crashed into the ground, 280 meters away from threshold 09 of the Crepurizão community runway. No evidence of previous impact was identified. The wreckage was concentrated.

The plane hit the ground in a pitch down attitude (approximately 10°) and banked left. There was fire after the impact.

Figure 1 - Location of the accident at the margins of a water reservoir with concentrated wreckage.

Damage to the propeller blades and engine flange indicated that the powertrain developed power at the moment of the impact.

The degree of destruction of the aircraft prevented the examination of other systems and onboard instruments, but the landing gear was found to be in the up position.

1.13 Medical and pathological information.

1.13.1 Medical aspects.

There was no evidence that physiological or disability aspects affected the crewman performance.

1.13.2 Ergonomic information.

Nil

1.13.3 Psychological aspects.

The pilot started his aviation activities in 1975 as a private pilot.

According to the perception of professionals working in the region, the pilot was a confident professional with a bold profile. According to the reports obtained, he had the habit of performing acrobatic maneuvers and low passes with the aircraft in the locality.

Although not registered, the Crepurizão runway was often used by aircraft from the region, including by the pilot involved in the occurrence.

It was not possible to obtain information regarding the pilot's routine on the day before the accident.

1.14 Fire.

The fire that started after the impact consumed the entire aircraft, except for the cabin door, which was thrown about 8 meters away.

1.15 Survival aspects.

There were no survivors.

1.16 Tests and research.

Nil.

1.17 Organizational and management information.

The operator was the pilot's son and there was no employment relationship between them.

It was not provided any information about the conducted air operations or the aircraft management.

1.18 Operational information.

Based on the collected reports and considering the number of people on board, it was concluded that the aircraft was within the weight and balance limits.

In the course of the investigation, it was found that the person on the right seat of the aircraft was also a pilot, but in this event, he was only a passenger.

According to the collected statements, the plane also carried a cargo of small volume and weight.

Videos presented to investigators during the field investigation showed the aircraft performing low-level passes and performing acrobatic maneuvers at the location (Figures 2 and 3).

Figure 2 - PT-AVO low pass in Crepurizão. In the background, there was the hangar in which the radio station was located.

Figure 3 - Acrobatic maneuvers after low pass in Crepurizão.

According to statements collected, the pilot had the habit of performing these types of maneuvers in the locality.

According to observers, the flight on which the accident occurred started with an aggressive takeoff, with rapid climb and subsequent left turn. After that, the plane lost altitude, with its left wing down, and crashed into the margins of a water reservoir.

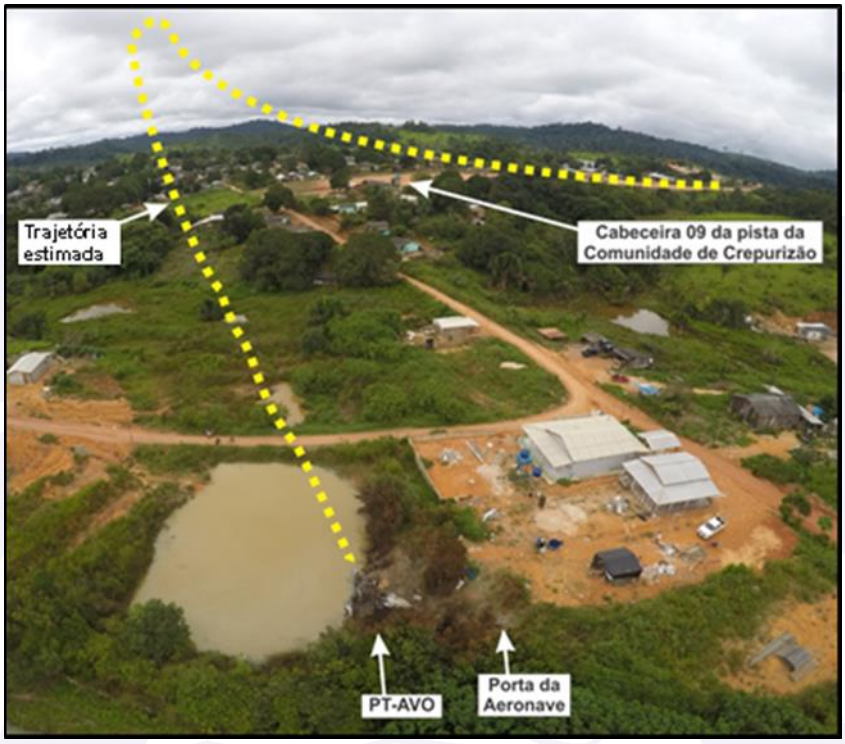

Figure 4 - Estimated trajectory of the aircraft until the crash site on the margins of a water reservoir.

The course taken by the plane after the left turn was very close to the one that would take it to its destination, the SWSI Aerodrome.

1.19 Additional information.

During the initial field investigation, it was found that aircraft from the region frequently used the unregistered Crepurizão runway.

However, throughout the period the investigators were in the locality, no air operations were observed. Apparently, the aircraft was removed from the scene prior to the arrival of the SERIPA I team.

However, ground marks and the existence of a radio station evidenced the use of the runway with some frequency.

According to reports, the locality of Crepurizão was a strategic point for the region gold mining aviation, since its geographical position favored the access to several areas where this activity was developed.

Regarding the operation in an unregistered Aerodrome, the RBHA No. 91 provided, in its section 91.102 - General Rules, letter (d), as follows:

> “91.102 - GENERAL RULES
>
> [...]
>
> (d) Except as provided in paragraph 91.325 of this regulation, no person may use an Aerodrome unless it is registered and approved for the type of aircraft involved and for the proposed operation.
>
> [...] ”

The same RBHA No. 91 also provided, in its section 91.5 Crew Requirements, letter (a), number (3), the following:

> "91.5 - CREW REQUIREMENTS
>
> (a) No person may operate a Brazilian registered civil aircraft unless:
>
> [...]
>
> (3) the operation is conducted by suitably qualified crewmembers for the aircraft and their function on board and holders of valid physical capacity certificate (our emphasis).
>
> [...] "

1.20 Useful or effective investigation techniques.

Nil.

2. ANALYSIS.

It was a cargo and personnel flight that would be carried out between the Crepurizão and Sinop Aerodromes.

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

Part of the airframe logbook cover was found burned amid the wreckage. Thus, it is likely that these documents were on board and were destroyed by the action of the fire.

Thus, in addition to not being able to establish the total hours of the aircraft or even the hours flown after the last inspection, the maintenance records could not be examined, in order to detect the existence of circumstances related to the maintenance of the aircraft that could have contributed to the event.

Considering that the propeller blade and engine flange conditions indicated that the powertrain developed power at the moment of the collision, the possibility that an engine failure caused loss of control of the aircraft was ruled out.

Due to the degree of destruction caused by the impact and the ensuing fire, other possibilities for system failure could not be ascertained.

Despite the ease of access to the runway, no evidence was found that an incursion or wildlife strike contributed in any way to the accident.

Although the registration of the Crepurizão runway was canceled in 2007, the existence of an unofficial operations support infrastructure and, according to reports, considerable movement of aircraft in the locality indicated that both operators and pilots in the area were accustomed to operate in that locality.

This fact indicated that there was, among these professionals, an informal culture for the use of that runway, despite the irregularity of the air operations. The practices and values shared by pilots in the region may have contributed to the development of a flight profile that is incompatible with the precepts of flight safety as presented by the pilot involved in this occurrence.

According to the information obtained, it was customary for the pilot to perform acrobatic maneuvers and low passes with the aircraft. This behavioral pattern indicated a complacent attitude toward the risks involved in the air operations he conducted.

In addition to the reports received, this fact could be evidenced in the video in which the crewmember performed a low pass and then performed acrobatic maneuvers, demonstrating an attitude marked by overconfidence and exhibitionism.

When considering the behavioral pattern presented by the pilot, associated with the takeoff profile reported by the observers, it is possible that the aggressive maneuver performed during takeoff was intentionally performed.

This hypothesis was also supported by the fact that the direction taken by the plane after the left turn was very close to the one that would take it to its destination, the SWSI Aerodrome. (Figure 5).

Figure 5 - Estimated trajectory, heading to SWSI and place of fall.

Considering the reports of the observers on the ground, it is likely that upon reaching the highest point on the take-off line, the aircraft was at a low speed and a steep turn was commanded.

In this scenario, it is possible that the plane was placed in an attitude from which, due to the loss of lift produced by the low speed and wing bank, there was not enough altitude to perform a recovery and prevent collision with the ground.

In this case, an improper use of the aircraft flight controls may have placed it in a condition in which the pilot's skills and maneuverability would not allow the ground crash to be avoided.

Within this context, an inadequate assessment of the aircraft maneuverability and its own limitations may have motivated the pilot to perform the flight profile that resulted in this accident.

Based on the information collected and corroborated by images presented to the investigators, it was inferred that the pilot's actions were compatible with inappropriate postures of self-confidence and exhibitionism.

Thus, this attitude is likely to have impaired the proper judgment of critical elements relevant to safe flight, particularly in relation to the risks involved in the maneuver performed.

In this context, the pilot's ability to correctly analyze existing circumstances would be impaired to the point of compromising the quality of his decision-making process and leading to action incompatible with the expected flight profile to ensure the success of that air operation.

Although this fact apparently did not contribute to the occurrence, the unregistered runway operation contradicted the requirement established by RBHA No. 91.

Similarly, the conduct of the aircraft by a pilot with expired CMA characterized a violation of the crew requirements established by the same RBHA.

3. CONCLUSIONS.

3.1 Facts.

a) the pilot's CMA was overdue since 05NOV2017;

b) the pilot had valid MLTE and MNTE Ratings;

c) it was not possible to determine whether the pilot was qualified or his experience in the type of flight;

d) the aircraft had valid Airworthiness Certificate (CA);

e) the aircraft was within the weight and balance limits;

f) the airframe, engine and propeller logbooks were not presented to the investigators;

g) according to information, the weather conditions were favorable for the visual flight;

h) the Crepurizão community Aerodrome had its registration canceled in 2007;

i) reports collected during the field investigation, ground markings and the existence of a radio station evidenced the use of the unregistered Crepurizão runway quite often by aircraft from the region;

j) the operation in unregistered runway contradicted the requirement established by RBHA No. 91;

k) the conduction of the crashed aircraft by a pilot with an expired CMA characterized the violation of the crew requirements established by RBHA No. 91;

l) videos presented to the investigators during the initial field investigation showed the aircraft performing low passes and performing acrobatic maneuvers in the locality;

m) people interviewed during the initial field investigation stated that the pilot had a habit of performing these types of maneuvers in the locality;

n) ground observers who witnessed the takeoff reported that, shortly after leaving the ground, the aircraft made an aggressive climb and turned left losing altitude;

o) the aircraft collided with the ground, at the margins of a water reservoir, about 280 meters from the threshold 09 of the Crepurizão runway;

p) there was fire after the impact;

q) damage to the propeller blades and engine flange indicated that the powertrain developed power at the moment of the impact;

r) the degree of destruction of the aircraft prevented the examination of other systems and onboard instruments;

s) the aircraft was destroyed; and

t) the pilot and passengers suffered fatal injuries.

3.2 Contributing factors.

- **Control skills – undetermined.**

It is possible that due to improper use of the flight controls the plane was placed in an attitude from which, due to the loss of lift produced by the low speed and wing bank, there was not enough altitude to perform a recovery and prevent collision with the ground.

- **Attitude – undetermined.**

Considering that it was customary for the pilot to perform flights with operating profiles that differed from those recommended for a safe flight, it is possible that the excessive

confidence and exhibitionist pattern demonstrated by the pilot favored the adoption of inappropriate parameters during takeoff.

- **Work-group culture – undetermined.**

Informal practices and values shared by professionals operating in that region were in favor of non-compliance with rules and procedures, which may have contributed to the pilot's increased level of self-confidence and the development of a flight profile incompatible with the precepts of safety.

- **Piloting judgment – undetermined.**

It is possible that an inadequate assessment of the aircraft maneuverability and its own limitations motivated the pilot to perform the flight profile that resulted in this accident.

- **Decision-making process – undetermined.**

It is possible that the pilot misjudged the circumstances in that operational context, which led him to act inconsistently with the expected flight profile to ensure the success of that air operation.

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:

To the Brazil's National Civil Aviation Agency (ANAC):

A-020/CENIPA/2018 - 01 **Issued on 04/22/2020**

Act in the district of Crepurizão, located in the municipality of Itaituba - PA, in order to inhibit the use of the unregistered Aerodrome existing in that locality, in order to avoid aeronautical occurrences resulting from inadequate airport infrastructure.

A-020/CENIPA/2018 - 02 **Issued on 04/22/2020**

Disseminate the lessons learned in the present investigation, in order to alert Brazilian civil aviation pilots and operators about the importance of knowing and respecting the performance limits of the aircraft operated.

5. CORRECTIVE OR PREVENTATIVE ACTION ALREADY TAKEN.

None.

On April 22th, 2020.