COMANDO DA AERONÁUTICA

CENTRO DE INVESTIGAÇÃO E PREVENÇÃO DE ACIDENTES AERONÁUTICOS

FINAL REPORT
A - 060/CENIPA/2018

OCCURRENCE:	**ACCIDENT**
AIRCRAFT:	**PT-OVJ**
MODEL:	**PA 25-235**
DATE:	**03APR2018**

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 03APR2018 accident with the PA 25-235 aircraft model, registration PT-OVJ. The accident was classified as “[SCF-PP] System/Component Failure or Malfunction Powerplant – Engine Failure in Flight”.

During a pesticide spraying flight in a plantation, the pilot declared that the engine suddenly lost power, causing the collision against the local vegetation.

The aircraft had substantial damage.

The pilot suffered serious injuries.

An Accredited Representative of the *Junta de Investigación de Accidentes de Aviación Civil* (JIAAC) - Argentina, (State where the aircraft was designed) was designated for participation in the investigation.

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GLOSSARY OF TECHNICAL TERMS AND ABBREVIATIONS

AEV	Special Flight Authorization
ANAC	Brazil's National Civil Aviation Agency
ANP	National Agency of Petroleum, Natural Gas and Biofuels
CA	Airworthiness Certificate
CMA	Aeronautical Medical Certificate
DCTA	Department of Science and Airspace Technology
IS	Supplementary Instruction
JIAAC	Junta de Investigación de Accidentes de Aviación Civil
MNTE	Airplane Single Engine Land Rating
PAGA	Agricultural Pilot Rating - Airplane
PCM	Commercial Pilot License – Airplane
PPR	Private Pilot License – Airplane
SAE	Aircraft Registration Category of Specialized Air Service
SIPAER	Aeronautical Accident Investigation and Prevention System
SNAP	ICAO Location Designator – Janaúba Aerodrome - MG

1. FACTUAL INFORMATION.

Aircraft	**Model:** PA 25-235 **Registration:** PT-OVJ **Manufacturer:** Piper Aircraft	**Operator:** Antonio & Carmelia Agricultural Aviation Ltd.
Occurrence	**Date/time:** 03APR2018 - 2030 UTC **Location:** Out of the Aerodrome **Lat.** 15°42'55"S **Long.** 043°16'14"W **Municipality – State:** Janaúba – MG	**Type(s):** "[SCF-PP] System/Component Failure or Malfunction Powerplant" **Subtype(s):** Engine Failure in Flight

1.1 History of the flight.

The aircraft took off from the Janaúba Aerodrome (SNAP) - MG, at about 2015 (UTC), in order to carry out a pesticide spraying flight in a banana plantation, 6km away from the runway, with a pilot on board.

During one of the passages over the plantation, the pilot declared that the engine suddenly lost power and, subsequently, it crashed into the vegetation.

The aircraft had substantial damage.

The pilot suffered serious injuries.

1.2 Injuries to persons.

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

1.3 Damage to the aircraft.

The aircraft had substantial damage to its entire structure, engine and propeller.

1.4 Other damage.

None.

1.5 Personnel information.

1.5.1 Crew's flight experience.

Flight Hours	Pilot
Total	995:31
Total in the last 30 days	12:06
Total in the last 24 hours	00:42
In this type of aircraft	304:30
In this type in the last 30 days	12:06
In this type in the last 24 hours	00:42

N.B.: The data related to the flown hours were obtained through the records in the aircraft logbook, as well as information provided by the pilot.

1.5.2 Personnel training.

The pilot took the PPR course at the Minas Gerais Aeroclub, Belo Horizonte - MG, in 2002.

1.5.3 Category of licenses and validity of certificates.

The pilot had valid PCM License and MNTE and PAGA 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 AR25-8656003, was manufactured by Piper Aircraft, in 1993 and was it was registered in the SAE category.

The aircraft had valid Airworthiness Certificate (CA).

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

The airframe, engine, and propeller logbook records were outdated in Part I - Monthly Usage Records.

The last inspection of the aircraft, the “1.000 hours” type, was performed on 04APR2012, by the maintenance organization *Tangará Aero Center* Ltd., in Orlândia - SP, having flown 377 hours and 40 minutes after the inspection.

1.7 Meteorological information.

The weather conditions were favorable for the flight.

1.8 Aids to navigation.

Nil.

1.9 Communications.

Nil.

1.10 Aerodrome information.

The occurrence took place out of the Aerodrome.

1.11 Flight recorders.

Neither required nor installed.

1.12 Wreckage and impact information.

The aircraft wreckage was found in an area of dense vegetation, with medium-sized trees.

The evidence found at the accident site indicated that the first impact was against the top of one of these trees. The marks in the vegetation were suggestive of reduced horizontal displacement of the wreckage, which were grouped, as can be seen in Figure 1.

Figure 1 - View of the aircraft at the location of the occurrence, indicating the characteristics of the wreckage and the marks left in the vegetation.

The propeller blades were practically free of deformation, as can be seen in Figure 2.

Figure 2 - View of the propeller blades, highlighting the low degree of deformation.

1.13 Medical and pathological information.

1.13.1 Medical aspects.

Nil.

1.13.2 Ergonomic information.

Nil.

1.13.3 Psychological aspects.

Nil.

1.14 Fire.

There was no fire.

1.15 Survival aspects.

Nil.

1.16 Tests and research.

Fuel samples were collected from the aircraft tank and from the storage location, being subjected to exams at the ANP and at the DCTA, which attested that both were limpid in appearance and free from impurities.

The engine was collected, disassembled and examined on bench. None of its systems (ignition, fuel and lubrication), as well as none of the other items inspected, showed signs of malfunction.

Thus, the tests carried out did not identify evidence of anything that would justify the loss of power or the switching off of the engine during the flight.

The examination of the aircraft's wreckage at the accident site and, subsequently, of its systems and components, of the control surfaces and flaps, of the panel switches and the position of the levers, did not identify indications of errors, defects or malfunction.

According to the aircraft maintenance records, the inspections and revisions prevised were performed and were updated. The aircraft had AEV n°135/2015/GTAR-DF for operation with Ethanol, as previsted in the IS n°137.201-001 Revision B.

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 pilot reported that, on the day of the occurrence, all the preparatory actions took place within normal limits. He checked the fuel, performed the pre-flight inspection of the aircraft, checking the mixture, magnets and other items provided, including the amount of crop protection in the hopper.

He said that the weather conditions were favorable and thus continued the actions, proceeding to takeoff.

After the application flight, the pilot declared that he made three to four “shots” (passes over the plantation making the spraying of the agricultural product) and that during one of these passages, the engine suddenly lost power.

Immediately, he acted on the mixing and power levers, in an attempt to recover it, but he was unsuccessful. According to the pilot, the engine just “failed” and “choked”, without developing power.

Before this situation, the pilot reported that he tried to maintain the heading, pitched up the aircraft to pass a power grid, disposed of the remaining agricultural product and looked for a place ahead to make an emergency landing.

The crewmember said he tried to land in a dry pond, but ended up hitting the treetops.

The sketch in Figure 3 illustrates the aircraft's trajectory, since the takeoff from the Janaúba runway to the location of the occurrence.

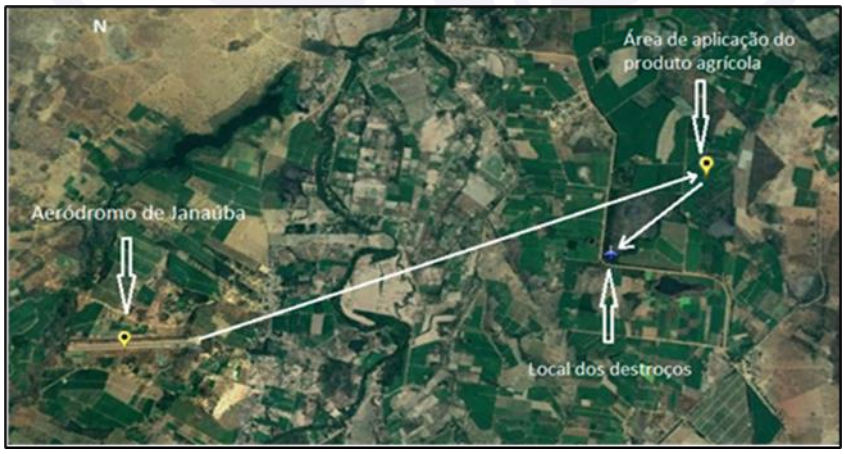

Figure 3 - Sketch of the aircraft's trajectory.

Three observers, who were 250m from the scene of the occurrence, said that they were used to seeing agricultural planes passing by, but that it passed by making a “different” noise; very strong and failing. In the words of one of them: “as if it were a motorcycle with its engine failing”.

1.19 Additional information.

Nil.

1.20 Useful or effective investigation techniques.

Nil.

2. ANALYSIS.

It was a pesticide spraying flight.

The pilot reported that on the day of the occurrence, there was no abnormality in the actions of preparing the aircraft for the flight and that the weather conditions were favorable, proceeding normally for takeoff.

According to his reports, the flight over the plantation went on normally until the engine suddenly started to fail and lose power during one of the passages. In view of the situation, the crewmember reported that he acted on the mixing and power levers, but that he was not successful in trying to recover traction.

He also said that he maintained the heading, passed a power grid, disposed of the remaining pesticide, and looked for a place ahead to make an emergency landing. With that, he ended up crashing into the treetops, probably with a speed close to stall. The evidence found at the accident site indicated this condition.

The marks on the vegetation and the damage caused to the aircraft, whose wwreckage was grouped, indicated that the collision with the ground occurred with low speed ahead and with a wide angle of impact.

Several components of the aircraft were analyzed, but no evidence of malfunction was identified. The examinations of the fuel samples showed that both were clean and free from impurities. The same occurred with the engine, whose exams found no signs of malfunction that justified the loss of power or its extinguishing during the flight. The tests of the other components and systems of the aircraft also did not identify signs of errors, defects or malfunction. The aircraft's maintenance records ensured that the planned inspections and reviews were performed and were updated. Thus, no objective evidence has been identified in this field of research.

However, notwithstanding the results obtained in examining the engine and its components, the analysis of the operational context in which this occurrence was consummated is fully compatible with a condition of loss of power or engine failure in flight.

In this sense, the aspect and deformations observed in the propeller blades corroborate to this condition, since they allow us to observe that they did not suggest power development. On the contrary, they indicated that at the moment of impact, the propeller had low or no rotation. The results of the analysis and research did not find evidence of operational error or malfunction of any of the aircraft's systems.

On the other hand, there were strong indications that the aircraft lost power during the spraying flight, a fact that forced the pilot to make an emergency landing, which could have been successful if the characteristics of the vegetation at the site were not so adverse for this type of operation.

Thus, considering the elements of investigation gathered, the hypothesis remained that the aircraft had a momentary failure in its powerplant. This possibility is compatible with the "different" noise reported by the observers that have been heard.

3. CONCLUSIONS.

3.1 Facts.

a) the pilot had valid CMA;

b) the pilot had valid MNTE and PAGA Ratings;

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 airframe, engine and propeller logbook records were outdated in Part I - Monthly Usage Records;

g) the weather conditions were favorable for the flight;

h) the aircraft wreckage was concentrated and found in an area of medium-sized vegetation, 1.2 km from the spraying area;

i) the marks left on the vegetation showed that the collision against the ground occurred with low speed and a large impact angle;

j) the research and analysis of the aircraft wreckage did not identify signs of errors, defects or malfunction in the aircraft systems;

k) the aircraft maintenance records attested that the inspections and revisions prevised were performed and were updated;

l) the examinations were carried out on samples of the aircraft's fuel, which concluded that it had a clean appearance and was free of impurities;

m) the aircraft's engine was examined on a bench and none of its components showed signs of malfunction;

n) in the analysis performed on the aircraft's engine, there was no evidence of anything that justified the loss of power or the stop during the flight;

o) the aircraft had substantial damage; and

p) the pilot suffered serious injuries.

3.2 Contributing factors.

- **Other – undetermined.**

It was not possible to determine what were the contributing factors that led to the accident.

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-060/CENIPA/2018 - 01 **Issued on 07/08/2021**

Work with Antonio & Carmelia Agricultural Aviation Ltd., so that operator can improve its administrative mechanisms for monitoring and checking the records of the utilization registers of its aircraft, aiming at a correct control of the necessary maintenance services, as a way to prevent aeronautic occurrences.

5. CORRECTIVE OR PREVENTATIVE ACTION ALREADY TAKEN.

None.

On July 8th, 2021.