COMANDO DA AERONÁUTICA

CENTRO DE INVESTIGAÇÃO E PREVENÇÃO DE ACIDENTES AERONÁUTICOS

FINAL REPORT
A-547/CENIPA/2015

OCCURRENCE:	**ACCIDENT**
AIRCRAFT:	**PR-STO**
MODEL:	**A188B**
DATE:	**02MAR2012**

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 item 3.1, 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 02 March 2012 accident involving the A188B aircraft, registration PR-STO. The accident was classified as inflight collision with obstacle.

As the aircraft was making a low pass for the application of agricultural pesticides on a manioc plantation, its vertical stabilizer collided with eletric wires, causing the aircraft to lose control and crash into the ground.

The pilot died two days after the accident.

The aircraft was destroyed in the crash.

An accredited representative of the American *National Transportation Safety Board* – (NTSB) was designated for participation in the investigation.

CONTENTS

GLOSSARY OF TECHNICAL TERMS AND ABBREVIATIONS

ANAC	Brazil's National Civil Aviation Agency
ATS	Air Traffic Services
CA	Airworthiness Certificate
CENIPA	Aeronautical Accident Investigation and Prevention Center
CG	Center of Gravity
CHT	Technical Qualification Certificate
CIV	Pilot's Flight Logbook
CMA	Aeronautical Medical Certificate
Lat	Latitude
Long	Longitude
MNTE	Airplane, Single-Engine, Land – ASEL
NTSB	National Transportation Safety Board (USA)
PAGR	Agricultural Pilot
PCM	Commercial Pilot – Airplane category
PPR	Private Pilot – Airplane category
RBHA	Brazilian Aeronautical Certification Regulation
RELPREV	Prevention Report
RS	Safety Recommendation
SAE-AG	Specialized Air Service (Agriculture)
SERIPA V	5th Regional Aeronautical Accident Investigation and Prevention Service
SINDAG	Union of National Agricultural Aviation Companies
SIPAER	Aeronautical Accident Investigation and Prevention System
UTC	Universal Time Coordinated
VFR	Visual Flight Rules

1. FACTUAL INFORMATION.

Aircraft	**Model:** A188B **Registration:** PR-STO **Manufacturer:** Cessna Aircraft.	**Operator:** CEAL *Aviação Agrícola Ltda*.
Occurrence	**Date/time:** 02 March 2012 / 13:50 UTC **Location:** Sítio Santa Rosa **Lat.** 23°05'52"S **Long.** 053°32'10"W **Municipality – State:** *Querência do Norte – Paraná* State.	**Type(s):** Inflight collision with obstacle.

1.1 History of the flight.

The aircraft took off from a contingent airstrip in the locality of Querência do Norte, Paraná State, for a VFR crop-dusting flight.

While making a low pass for the application of pesticides, the aircraft vertical stabilizer hit electric wires, causing the aircraft to lose control in flight and crash into the ground.

The pilot died two days after the accident.

1.2 Injuries to persons.

Injuries	Crew	Passengers	Others
Fatal	1	-	-
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.

Hours Flown	
	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	57:00
In this type in the last 24 hours	00:50

N.B.: Data obtained from records kept by the company. Other pieces of information are missing due to the unavailability of a Pilot's Flight Logbook and other sources.

1.5.2 Professional formation.

The pilot did a Private Pilot course (airplane category) in 1993 and a Commercial Pilot course (airplane category) in 1998.

No information was available relative to the locations at which the pilot earned his licenses and certificates.

1.5.3 Category of licenses and validity of certificates.

The pilot held a Private Pilot license and a Commercial Pilot license. His ASEL and Agricultural Pilot certificates were valid.

1.5.4 Qualification and flight experience.

The pilot had qualification for the flight, but it was not possible to verify whether he had enough experience for conducting the type of flight.

1.5.5 Validity of medical certificate.

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

1.6 Aircraft information.

The low wing single-engine A-188B aircraft was manufactured by Cessna Aircraft in 1972. It was registered in the Specialized Air Services (Agricultural) category (SAE-AG).

The airworthiness certificate of the aircraft was valid.

The airframe, engine, and propeller logbook records were up-to-date.

The last aircraft inspection/overhaul ("200 hours" type) was done by *Fenix Aviação Ltda.* (*Arapongas*, *Paraná* State) on 20 July 2011. The aircraft flew 36 hours and 30 minutes after the last inspection.

The aircraft had a total of 2,977 flight hours in its records.

The maintenance services were considered periodical and adequate.

1.7 Meteorological information.

The prevailing meteorological conditions were favorable for VFR flights.

1.8 Aids to navigation.

Nil.

1.9 Communications.

Nil.

1.10 Aerodrome information.

Not applicable.

1.11 Flight recorders.

Neither required nor installed.

1.12 Wreckage and impact information.

The accident occurred in a rural area of the municipality of *Querência do Norte*, State of Paraná.

The aircraft wreckage remained concentrated. The aircraft first impacted electric wires and then crashed into the ground. The right wing detached from the fuselage and was found under it. The aircraft final position was at an angle of 90 degrees with the original trajectory.

The type of deformation sustained by the propeller blades was suggestive that the engine was developing power at the moment of the collision.

The aircraft trajectory is depicted in Figure 1.

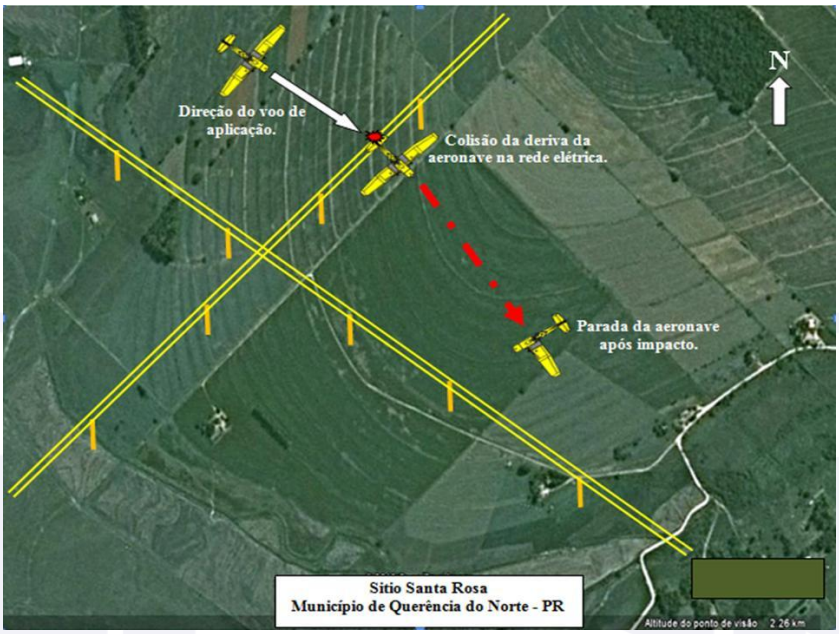

Figure 1 – Croquis showing the aircraft trajectory.

Figure 2 – Position of the aircraft after the crash.

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1.13 Medical and pathological information.

1.13.1 Medical aspects.

According to his medical background, the pilot did not have pathologies capable of causing sudden illness, since there were no records of cardiovascular, respiratory or neurological alterations.

He did not have complaints related to the digestive system. Although he had some bilateral hearing loss, this was not a factor in the accident. He also had presbyopia, which required the use of correcting lenses, but it was not possible to determine whether he was wearing them while flying the aircraft.

It was not possible to collect material for toxicological exams relative to the use of legal and/or illegal drugs. The necropsy report informed that the *causa mortis* were the traumas suffered in the crash.

Thus, one may infer that there were no medical reasons that could be associated with factors contributing to the accident.

1.13.2 Ergonomic information.

Nil.

1.13.3 Psychological aspects.

Not investigated.

1.14 Fire.

No signs of either inflight or post-impact fire.

1.15 Survival aspects.

The first people to arrive at the crash site were employees of the *CEAL Aviação Agrícola Ltda*., owner of the aircraft.

The pilot was rescued and taken, still alive, to the *Municipal Hospital of Querência do Norte*, where he received first aid. He was then taken to the *Santa Casa de Paranavaí* (a charitable hospital), where he passed away on 4 March 2012 at 10:45 local time, that is, two days after the accident.

The pilot's *causa mortis*, according to the 47/2012 cadaveric exam report issued by the forensic medical institute of *Paranavaí*, was hemorrhagic and septic shock.

1.16 Tests and research.

Nil.

1.17 Organizational and management information.

The *CEAL Aviação Agrícola Ltda.* company started operations in 2004. Its head-quarters was in the municipality of *Palotina*, *Paraná* State. The owners were the same up to the date of the accident.

The organizational structure of the company was rather simple. The board of pilots consisted of 4 professionals, and they had 4 aircraft. The pilots' exclusive job was to fly the fleet aircraft.

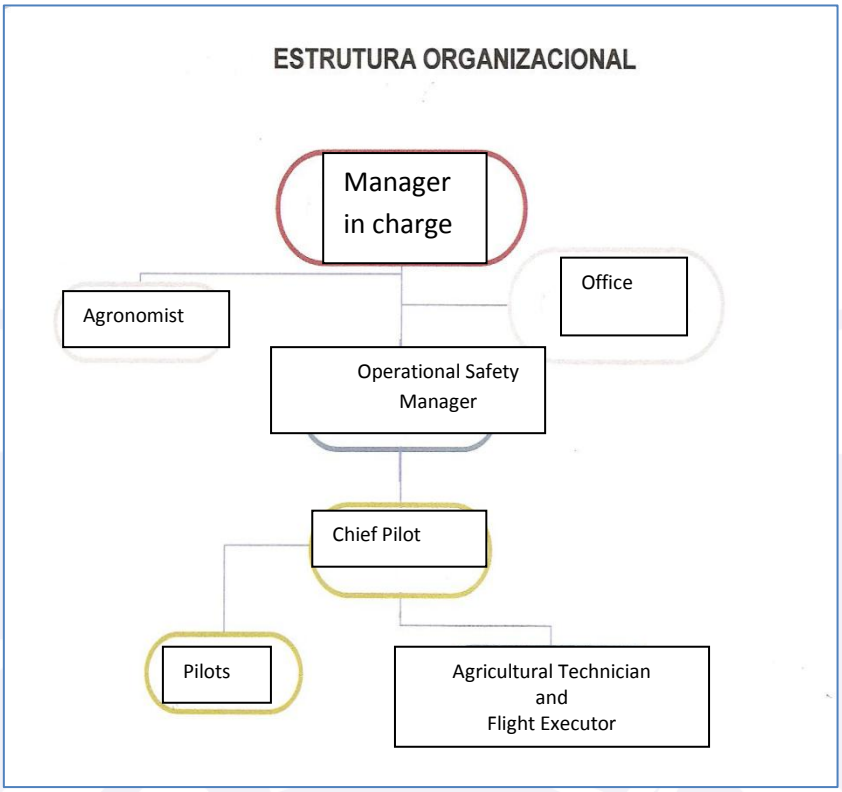

Figure 3 – Organizational structure of the company.

The pilot had already flown for the company in September 2011, but was only hired in the month of December.

The company had an Operational-Safety Manager (GSO), and complied with the activities prescribed in the Manual on Operational-Safety Management (MGSO).

1.18 Operational information.

The pilot was involved with the application of pesticides in an area of manioc plantation. On the day of the accident, there was only a small area to be sprayed sot that he could finish the job.

At the moment of the collision with the wires (approximately 13:50 UTC), the aircraft was making a low pass in a northeasterly direction, that is, with the sun straight ahead.

In the crash-site, the electric lines were at a height of 6 meters above the ground. In the direction flown by the aircraft, there was a smooth and continuous acclivity of the terrain just after the wires.

The aircraft weight and center of gravity (CG) values were within the limits prescribed by the manufacturer.

1.19 Additional information.

According to local dwellers and workers, aircraft were commonly sighted passing below electric wires and flying close to the ground. It was a well-known routine conduct in the region.

1.20 Useful or effective investigation techniques.

Nil.

2. ANALYSIS.

From the information collected in the initial action by the go-team, the possibility of jamming of aircraft controls or contingent aircraft mechanical/structural failure was ruled out. The bending of the propellers at the moment of collision suggested that the engine was developing power.

In the initial action, the go-team verified that the aircraft vertical stabilizer had hit electric wires, causing the aircraft to lose control and crash into the ground.

Two hypotheses were raised for the occurrence:

The first hypothesis is that the pilot would have attempted to pass below the wires and committed an error of calculation, since the terrain ahead had a slight acclivity. This hypothesis is reinforced by reports from witnesses who said this was a common type of maneuver, leading one to the belief that many pilots might have "assimilated" it as a normal maneuver.

The second hypothesis is that the pilot may not have sighted the wires. This hypothesis is reinforced by the fact that he was flying with the sun ahead and that he needed to wear correcting lenses, something that could not be verified. However, on the day after the day of the occurrence, it was possible to determine that the conditions of luminosity allowed a perfect definition of the relief and the sighting of natural obstacles at the time of the accident.

Also, one has to consider that the pilot was already familiarized with the terrain, since he had flown in that area before.

3. CONCLUSIONS.

3.1 Facts.

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

b) The pilot held a valid Technical Qualification Certificate (CHT);

c) The pilot had qualification, but it was not possible to verify whether he had enough expereince for the conduction of the flight;

d) The aircraft had a valid airworthiness certificate (CA);

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

f) The airframe, engine, and propeller logbook records were up-to-date;

g) The maintenance services were considered periodical and adequate;

h) The meteorological conditions were favorable for the conduction of a VFR flight;

i) The aircraft took off from a contingent airstrip for a VFR flight with the purpose of applying agricultural pesticides on a manioc plantation;

j) As the aircraft was making a low pass for the application of the pesticide, its vertical stabilizer hit electric wires;

k) Control of the aircraft was lost, and it crashed into the ground;

l) The aircraft was destroyed; and

m) The pilot died from the injuries two days after the occurrence.

3.2 Contributing factors.

- **Visual illusions – undetermined.**

It is possible that the pilot may have had false or misinterpreted sensory impressions since he was flying with the sun ahead of him at the moment of the accident.

- **Influence from the environment – undetermined.**

There is the possibility that the relative position of the sun may have degraded the pilot's visual perception.

- **Piloting judgment – undetermined.**

In the hypothesis that the pilot may have deliberately attempt to pass under the electric wires, there is the possibility that he misjudged the maneuver.

- **Flight planning – undetermined.**

The pilot may have planned the flight considering passing under the wires instead of flying over them.

4. SAFETY RECOMMENDATION.

A measure of preventative/corrective nature issued by a SIPAER Investigation Authority or by a SIPAER-Link within respective area of jurisdiction, aimed at eliminating or mitigating the risk brought about by either a latent condition or an active failure. It results from the investigation of an aeronautical occurrence or from a preventative action, and shall never be used for purposes of blame presumption or apportion of civil, criminal, or administrative liability.

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".

None.

5. CORRECTIVE OR PREVENTATIVE ACTION ALREADY TAKEN.

None.

On March 18th 2016.