

COMANDO DA AERONÁUTICA
CENTRO DE INVESTIGAÇÃO E PREVENÇÃO DE
ACIDENTES AERONÁUTICOS



FINAL REPORT
A-141/CENIPA/2021

OCCURRENCE:	ACCIDENT
AIRCRAFT:	PU-MDJ
MODEL:	P2002 SIERRA DE LUXE
DATE:	11DEZ2021



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 considering 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 distinct 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. Considering 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 11 December 2021 accident with the *P2002 Sierra de Luxe* aircraft, registration marks PU-MDJ. The occurrence was typified as “[SCF-PP] Engine failure or malfunction | Engine failure in flight, and [LOC-I] Loss of control in flight.”

After taking off from the threshold 09 of the unregistered runway of *Fazenda Estrela*, in the municipality of *Anaurilândia*, State of *Mato Grosso do Sul*, the aircraft remained in the traffic pattern and joined the downwind leg. Shortly later, the airplane's engine sustained a momentary failure.

The pilot chose to perform a traffic circuit for landing on the runway 27, in the opposite direction used for takeoff. After the aircraft entered the base leg for landing, its engine stopped functioning, and the pilot did not make it to the runway.

The plane collided with a gate located at a distance of approximately 400 meters short of the runway threshold.

The aircraft sustained substantial damage.

The pilot was slightly injured. The passenger received no injuries.

For being Italy the State of manufacture of the aircraft, an accredited representative of the ANSV (*Agenzia Nazionale per la Sicurezza del Volo*) was designated for participation in the investigation of the occurrence.

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GLOSSARY OF TECHNICAL TERMS AND ABBREVIATIONS

ANAC	Brazil's National Civil Aviation Agency
ANSV	Italy's <i>Agenzia Nazionale per la Sicurezza del Volo</i>
CAVE	Experimental-Flight Authorization Certificate
CENIPA	Brazil's Aeronautical Accidents Investigation and Prevention Center
CIV	Pilot Logbook
CMA	Aeronautical Medical Certificate
CVA	Airworthiness-Verification Certificate
DRACCO-MS	<i>Departamento de Repressão à Corrupção e Combate ao Crime Organizado do Mato Grosso do Sul</i> (State of Mato Grosso do Sul - Directorate for the Repression of Corruption and Organized Crime)
FAA	USA's <i>Federal Aviation Administration</i>
FSTD	Flight Simulation Training Device
IAC	Civil Aviation Instruction
IS	Supplementary Instruction
MNTE	Single-Engine Land Airplane Class Rating
NSCA	System Norm of the Command of Aeronautics
PET	Private Experimental-Aircraft Registration Category
PIC	Pilot in Command
PMD	Maximum Take-Off Weight (MTOW)
PPR	Private Pilot License (Airplane)
RBAC	Brazilian Civil Aviation Regulation
RBHA	Brazilian Aeronautical Certification Regulation
SACI	Sistema Integrado de Informações da Aviação Civil
SERIPA IV	4 th Regional Service for the Investigation and Prevention of Aeronautical Accidents
SIPAER	Brazil's <i>Aeronautical Accidents Investigation and Prevention System</i>
UTC	Universal Time Coordinated

1. FACTUAL INFORMATION.

Aircraft	Model: P2002 SIERRA DE LUXE Registration: PU-MDJ Manufacturer: <i>Costruzioni Aeronautiche Tecnam S.R.L.</i>	Operator: Private.
Occurrence	Date/time: 11DEZ2021 - 20:00 UTC Location: Dirt road close to MS-395 Hwy Lat. 22°10'56"S Long. 052°41'37"W Municipality – State: <i>Anaurilândia – State of Mato Grosso do Sul.</i>	Type(s): [SCF-PP] Powerplant failure or malfunction [LOC-I] Loss of control – inflight.

1.1. History of the flight.

The aircraft took off from the unregistered runway of *Fazenda Estrela, Anaurilândia, State of Mato Grosso do Sul*, for a local scenic flight, with 02 POB (a pilot and a passenger).

After taking off from the runway 09, the aircraft turned left to join the downwind leg. When the aircraft aligned with the downwind leg, a momentary failure of the engine occurred.

The pilot chose to perform a traffic circuit to land on runway 27, in the opposite direction to the one used for takeoff. After the aircraft entered the base leg for the said runway, the engine stopped functioning.

The pilot attempted to continue gliding towards the runway, but the plane collided with the gate of a fence located at a distance of approximately 400 meters short of the runway.



Figure 1 – View of the aircraft at the accident site.

The aircraft sustained substantial damage. The pilot suffered slight injuries, while the passenger was not injured.

1.2. Injuries to persons.

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

1.3. Damage to the aircraft.

The aircraft sustained substantial damage to its front section, landing gear, and wings.

1.4. Other damage.

The gate hit by the aircraft received minor damage.

1.5. Personnel information.

1.5.1. Crew's flight experience.

	PIC
Total	44:25
Total in the last 30 days	00:00
Total in the last 24 hours	00:00
In this type of aircraft	00:00
In this type in the last 30 days	00:00
In this type in the last 24 hours	00:00

N.B.: flight hour's data obtained through records of the CIV (pilot's digital logbook of the ANAC's SACI (Integrated Civil Aviation Information System)).

The crew did not present his physical CIV to the Investigation Commission.

The last flight recorded in the digital CIV was made on 14 May 2020, in a single-engine Cessna 150L airplane. At an interview, the PIC informed that he had made other flights after that date with his aircraft (PU-MDJ), and that he had a total of 300 hours of flight experience, 255 hours of which in the accident aircraft.

He stated that he had not logged the flights with the experimental aircraft in his CIV for believing that it was not necessary.

1.5.2. Personnel training.

The PIC did his PPR course (Private Pilot – Airplane) in 2014, at *Fly Company*, in *Campo Grande*, State of *Mato Grosso do Sul*.

1.5.3. Category of licenses and validity of certificates.

The PIC held a PPR License (Private Pilot - Airplane), and a valid Single-Engine Land Airplane (MNTE) rating.

1.5.4. Qualification and flight experience.

Because of the lack of records, it was not possible to determine with accuracy whether the pilot was qualified for the flight in question, or his level of experience.

1.5.5. Validity of medical certificate.

The PIC's CMA (Aeronautical Medical Certificate) had expired on 17 March 2021.

1.6. Aircraft information.

The SN 511 aircraft was a product manufactured by *Costruzioni Aeronautiche Tecnam Aircraft S.R.L.* in 2014. It was registered in the Private Experimental Aircraft Registration Category (P.E.T.).

The plane was being operated with an Experimental-Flight Authorization Certificate (CAVE). In consultation with the ANAC's SACI system, one could not verify the date of issuance of a CVA (Airworthiness Verification Certificate), nor was such information presented by the operator. Therefore, it was not possible to verify the aircraft's airworthiness status.

Moreover, the Investigation Commission did not have access to the flight manuals, to the program of maintenance and inspections of the aircraft, as well as to the airframe and engine logbooks. According to a report from the PIC, such documentation did not exist.

The MTOW of the PU-MDJ was 600 kg. The aircraft was equipped with a Rotax 912 engine.

1.7. Meteorological information.

According to a report from the PIC, the meteorological conditions were suitable for the flight.

1.8. Aids to navigation.

NIL.

1.9. Communications.

NIL.

1.10. Aerodrome information.

The unregistered dirt runway of *Fazenda Estrela* had the thresholds 09/27, measuring 990 m x 22 m, at an elevation of 985 ft.

According to the PIC, who was the owner of both the aircraft and the farm, the runway was used for landings and takeoffs of agricultural aircraft operating in the region. After the purchase of the PU-MDJ, he used the aircraft in his operations.

1.11. Flight recorders.

Neither required nor installed.

1.12. Wreckage and impact information.

According to the PIC, while on the turn for alignment with the final approach of runway 27, the aircraft stalled after sustaining total engine failure. The plane came to a stop over the gate of a fence delimiting a rural property.

The aircraft was removed from the site without proper authorization issued by the SIPAER authority.



Figure 2 – view of the aircraft after removal from the scene of the occurrence.

The occurrence was reported to the investigating authority by the DRACCO-MS (*Mato Grosso do Sul's* Department for Repression of Corruption and Organized Crime), a Civil Police unit of the referred state.

1.13. Medical and pathological information.

1.13.1. Medical aspects.

There was no evidence that issues of physiological nature or incapacitation affected the pilot's performance.

1.13.2. Ergonomic information.

NIL.

1.13.3. Psychological aspects.

There was no evidence that issues of psychological nature or incapacitation might have affected the pilot's performance.

1.14. Fire.

There was no fire.

1.15. Survival aspects.

NIL.

1.16. Tests and research.

After removal of the aircraft from the accident site, the engine was examined by the owner, who reported that the fuel filter was blocked, hindering a normal flow of fuel to be sent to the engine, leading it to fail.

There was no information presented to the investigation commission on the sources of the fuel feeding the engine and on the fuelings performed.

1.17. Organizational and management information.

NIL.

1.18. Operational information.

The aircraft was engaged on a private flight under the requirements established by the RBAC-91 (Brazilian Civil Aviation Regulation nº 91).

It was not possible to determine whether the aircraft operated within its weight and balance limits.

According to a report from the PIC, after taking off from *Fazenda Estrela's* runway 09, he made a left turn in order to begin the scenic flight. When the airplane plane passed

1,000 feet, the aircraft's engine experienced a momentary failure but moments later, resumed normal operation.

Believing that he would have enough time to land on the runway 27, the approach profile with which he felt more comfortable, the PIC made another turn to the left, in order to join the traffic circuit for a landing on runway 27.

According to the PIC's report, due to the existence of a eucalyptus tree plantation close to the runway threshold, he extended the wind leg and, during the turn to the base leg of the traffic pattern, the aircraft sustained total engine failure, stalled, and fell onto a fence of the farm (Figure 3).

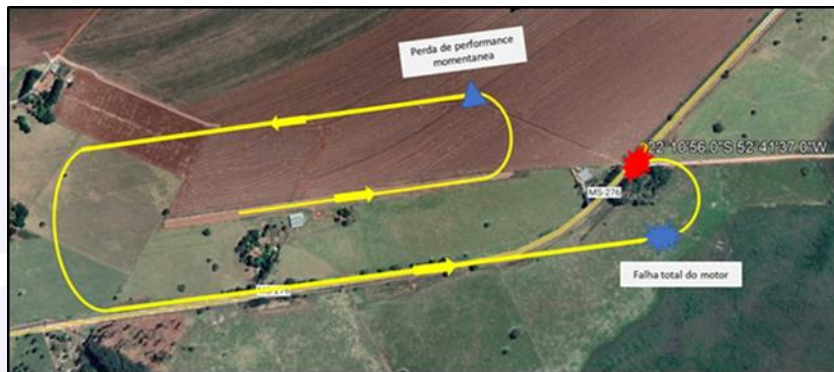


Figure 3 - Sketch of the sequence of events.

1.19. Additional information.

With respect to the communication of aeronautical occurrences, the Command of Aeronautics' System Norm 3-13 (NSCA 3-13), which established the Protocols for the Investigation of Civil Aviation Aeronautical Occurrences Conducted by the Brazilian State, in its paragraph 3.1.2, read the following:

3. PROCESS OF OCCURRENCE REPORTING AT A NATIONAL LEVEL

3.1 NOTIFICATION OF OCCURRENCE INVOLVING AN AIRCRAFT

3.1.2 Whenever there is any occurrence involving an aircraft, a notification shall be made by the owner or operator of the aircraft, through the filling out of the Notification available on the CENIPA website.

With regard to the preservation of clues and evidence, the referred NSCA also read the following in its paragraph 4.1.1:

4. GENERAL INVESTIGATION PROTOCOLS

4.1 PRESERVATION OF CLUES AND EVIDENCE

4.1.1 Except for the purpose of saving lives, no crashed aircraft, its remains, or things carried by it, may be searched or removed, unless in the presence or with authorization of the Investigator-in-Charge, in accordance with the CBA.

The RBAC-91, Amendment nº 03, which dealt with the General Operating Requirements for Civil Aircraft, contained, in its section 91.5 Requirements for crews, letter (a), number (3), the following:

91.5 Crew requirements

(a) The operation of a civil aircraft registered in Brazil is permitted, provided that:

[...]

(3) the operation is conducted by crew members appropriately licensed/certified and qualified for the aircraft in accordance with the RBAC-61 or RBHA-63, or the RBAC that supersedes it, for the function they perform on board, with recent experience, and holders of valid aeronautical medical certificates (CMA), issued in accordance with the RBAC-67.

The RBAC-91 also established, in its Subpart B - Flight Rules, section 91.102 General rules, letter (d), the following requirement:

SUBPART B - FLIGHT RULES

91.102 General rules

[...]

(d) one will only be allowed to use a Brazilian aerodrome if the aerodrome is registered, and the operator determines that such aerodrome is suitable for the type of aircraft involved, as well as for the proposed operation.

With regard to the validity of CAVEs, the RBAC-21 (Amendment 06), which dealt with the Certification of Aeronautical Products and Items, section 21.181, Validity, letter (a), number (4), specified the following:

21.181 Validity

(a) Unless returned by its holder, suspended, revoked, or with an expiration date established by the ANAC, a certificate of airworthiness has duration as follows:

[...]

(4) a certificate of experimental-flight authorization for the purposes of research and development, demonstration of compliance with requirements, crew training or market survey is valid for one (1) year after the date of issuance or renewal, unless a shorter period is established by the ANAC. The validity of this certificate for the purposes of operating amateur-built, exhibition, aerial competition, primary category or light sport category aircraft is unlimited, unless the ANAC establishes a specific period due to a justifiable reason;

However, the Supplementary Instruction (IS) 21.191-001, Revision A, dealing with "Amateur-Built Aircraft" and with the objective of providing information and procedures for the process of construction, operation, and keeping of airworthiness of amateur-built aircraft, based on the Advisory Circular (AC) 20-27G of the Federal Aviation Administration (FAA), recommended, among other procedures, the following:

5.8 Maintenance and Flight Safety

5.8.1 The amateur builder must elaborate a Flight Manual to establish all operational limitations applicable to the aircraft.

[...]

5.8.6 One should establish procedures for regular inspections of critical structural parts for evidence of wear, failures, cracks, etc., and keep records of abnormal occurrences.

5.8.7 The amateur builder must:

- a) Elaborate an aircraft maintenance and inspection program, and
- b) Open airframe and engine logbooks for the logging of appropriate notes (revisions, modifications, periodic inspections, etc.).

NOTE: Such records must be presented to the ANAC whenever requested.

5.8.8 After carrying out each *IAM*, the *RIAM* shall be filled out in accordance with the form available on the ANAC website.

Regarding the logging of flight hours in the CIV, the RBAC-61, which dealt with "Licenses, Ratings and Certificates for Pilots", contained, in its section 61.31, CIV and digital CIV, letter (a), the following requirement:

61.31 CIV and Digital CIV (Wording given by the Resolution No. 378, dated 03/18/2016)

(a) Every holder of a pilot license or CPA must log in their CIV their flight activities carried out in aircraft and in FSTD certified and approved by the ANAC.

1.20. Useful or effective investigation techniques.

NIL.

2. ANALYSIS.

It was a private flight under the requirements of the RBAC-91.

According to the PIC, the engine of the aircraft sustained a momentary failure at some point after the takeoff from the threshold 09 of the unregistered runway of *Fazenda Estrela*. Shortly later, there was total failure of the engine during the return for an intended landing on the runway opposite to the one used for takeoff.

However, taking into account the PIC's report that the examination of the engine showed obstruction of the fuel filter, one considered that such condition must have led to the failures sustained by the aircraft's engine

In relation to such abnormality, the fact that, according to the PIC, there was neither a maintenance and inspection program for the aircraft, nor airframe and engine logbooks, raised doubts on the quality of the maintenance services provided to the airplane, their periodicity of such services, and even whether the services were at all executed.

Similarly, the lack of information concerning the sources of the fuel that fed the engine and the fuelings performed, made it impossible to investigate a possible contamination capable of having caused the obstruction of the gasoline filter.

It was not possible to affirm with certainty that the absence of records related to the maintenance of the aircraft was a contributor to the occurrence in question. Nonetheless, the investigation commission considered that the lack of a program for the maintenance and inspections of the aircraft, as well as the lack of airframe and engine logbooks, together with the lack of a RIAM, characterized a complacent attitude relatively to the recommendations contained in the IS 21.191-001.

In addition, the PIC's failure to log the flight time in his CIV made it difficult for the investigators to establish the pilot's qualifications, particularly with regard to his recent experience.

Finally, although not related to the accident, the conduction of the flight by a pilot with an expired CMA, taking off from an unregistered runway, characterized non-compliance with the requirements established in the RBAC-91.

Operations that do not comply with aeronautical regulations in force may result in safety levels below the minimum acceptable ones established by the Brazilian State.

By failing to meet the minimum safety levels required by the Brazilian State, guaranteed through the compliance with the Brazilian Civil Aviation Regulations (RBAC), latent unsafe conditions might result, and neutralization or mitigation of such unsafe conditions will result from compliance with the very regulation.

3. CONCLUSIONS.

3.1. Findings.

- a) the PIC's CMA (Aeronautical Medical Certificate) had expired on 17 March 2021;
- b) the PIC held a valid MNTE rating (Single-Engine Land Airplane);
- c) it was not possible to determine whether the PIC was qualified for the flight;
- d) the aircraft did not have any technical maintenance records;
- e) the airstrip of *Fazenda Estrela* was not duly registered;
- f) the PIC reported that the meteorological conditions were suitable for the flight;

- g) it was not possible to determine whether the aircraft operated within its weight and balance limits;
- h) the PU-MDJ's maintenance and inspection programs, airframe and engine logbooks, as well as its flight manual were not presented to the Investigation Commission;
- i) the aircraft sustained engine failure in the traffic circuit, and the PIC attempted to perform an emergency landing;
- j) the airplane did not make it to the airstrip of the farm, and collided with a gate;
- k) the aircraft sustained substantial damage; and
- l) the PIC suffered slight injuries, and the passenger was not injured.

3.2. Contributing factors.

- Aircraft maintenance – undetermined.

The fact that, according to the PIC's report, there were no programs for the maintenance and inspection of the aircraft, nor airframe and engine logbooks, raised doubts on the quality of the maintenance services delivered to the airplane, their periodicity, and even on whether such maintenance services were effectively carried out.

- Support systems – undetermined.

The lack of a program for the maintenance and inspections of the aircraft, as well as the lack of airframe and engine logbooks, besides the lack of a RIAM (Annual Maintenance Inspection Report), may have contributed to the failure of traceability and maintenance actions to ensure the safe operation of the aircraft.

4. SAFETY RECOMMENDATIONS

None.

5. CORRECTIVE OR PREVENTATIVE ACTION ALREADY TAKEN.

None.

On December 29th, 2023.