COMANDO DA AERONÁUTICA

CENTRO DE INVESTIGAÇÃO E PREVENÇÃO DE ACIDENTES AERONÁUTICOS

FINAL REPORT
A-028/CENIPA/2021

OCCURRENCE:	**ACCIDENT**
AIRCRAFT:	**PR-NEX**
MODEL:	**PA-28-161**
DATE:	**20FEV2021**

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 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 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. 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 Final Report pertains to the February 20, 2021, accident involving the model PA-28-161 aircraft of registration marks PR-NEX. The occurrence was classified as “[SCF-PP] System/Component Failure or Malfunction (Powerplant).”

During takeoff, the airplane experienced a drop in engine RPM, followed by a loss of power. The pilot elected to return to the departure runway by executing a right turn. However, during the return maneuver, the tip of the right wing struck a wooden structure, resulting in the aircraft crashing into the swimming pool of a hotel.

The aircraft sustained substantial damage.

The pilot and passengers suffered minor injuries.

Being the United States of America the State of Manufacture of the aircraft, the USA’s NTSB (National Transportation Safety Board) designated an Accredited Representative for participation in the investigation of the accident.

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GLOSSARY OF TECHNICAL TERMS AND ABBREVIATIONS

ANAC	Brazil's National Civil Aviation Agency
AEV	Special Flight-Authorization
CENIPA	Brazil's Center for the Investigation and Prevention of Aeronautical Accidents
CIV	Digital Pilot-Logbook
CMA	Aeronautical Medical Certificate
CVA	Certificate of Airworthiness
DECEA	Command of Aeronautics' Department of Airspace Control
IAM	Annual Maintenance Inspection
IFRA	Instrument Flight Rating - Airplane
INVA	Flight Instructor Rating - Airplane
MLTE	Multi-Engine Land Airplane Class Rating
MNTE	Single-Engine Land Airplane Class Rating
PBZPA	Aerodrome Protection Zone Basic Plan
PLA	Airline Transport Pilot License - Airplane
POH	Pilot's Operating Handbook
PPR	Private Pilot License - Airplane
PIC	Pilot in Command
PZPPNA	Obstacle Protection Plan for Air Navigation Procedures
RBAC	Brazilian Civil Aviation Regulations
RPM	Revolutions per minute
SBBP	ICAO location designator - *Arthur Siqueira* State-Aerodrome, *Bragança Paulista*, State of *São Paulo*
SIPAER	Aeronautical Accidents Investigation and Prevention System
SN	Serial Number
SNPA	ICAO location designator – Aerodrome of *Pará de Minas*, state of *Minas Gerais*
SNDV	ICAO location designator - *Brigadeiro Antônio Cabral* Aerodrome, *Divinópolis*, state of *Minas Gerais*
SWVW	ICAO location designator - *Furnaspark Resort* Aerodrome, *Formiga*, state of *Minas Gerais*
TPP	Private Air Service Aircraft Registry Category
UTC	Coordinated Universal Time
VFR	Visual Flight Rules

1. FACTUAL INFORMATION.

Aircraft	**Model:** PA-28-161 **Registration:** PR-NEX **Manufacturer:** Piper Aircraft.	**Operator:** Private.
Occurrence	**Date/time**: 20FEV2021 – 18:25 (UTC) **Location:** *FurnasPark* Resort. **Lat.** 20°32'12"S **Long.** 045°36'24"W **Municipality – State:** *Formiga – Minas Gerais*	**Type(s):** [SCF-PP] Powerplant failure or malfunction

1.1. History of the flight.

At approximately 18:25 UTC, the aircraft took off from SWVW (*FurnasPark Resort* Aerodrome, municipality of *Formiga*, state of *Minas Gerais*), bound for SBBP (*Arthur Siqueira* State-Aerodrome, *Bragança Paulista*, state of *São Paulo*), with the purpose of repositioning to a maintenance base. On board were one pilot and two passengers.

During takeoff, the aircraft experienced a drop in engine RPM, followed by a loss of power. Given the situation, the pilot elected to return to the departure runway, executing a right-hand turn.

At low altitude, the aircraft overflew a hotel area near the runway and struck the tip of its right wing on a pergola (wooden structure), crashing into the hotel's swimming pool.

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

1.2. Injuries to persons.

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

1.3. Damage to the aircraft.

The aircraft sustained substantial damage. The right wing separated at the wing root, and damage extended along the entire span of the aircraft's lower surface.

1.4. Other damage.

Damage occurred to wooden structures near the aircraft's final resting point, and the hotel pool was contaminated with oil and gasoline from the aircraft.

1.5. Personnel information.

1.5.1. Crew's flight experience.

	PIC
Total	1,915:00
Total in the last 30 days	30:00
Total in the last 24 hours	05:00
In this type of aircraft	250:00
In this type in the last 30 days	15:00
In this type in the last 24 hours	[05:00]

Note: Flight time data obtained from information provided by the pilot, as no entries from his Individual Flight Logbook (CIV) were presented.

1.5.2. Personnel training.

The Pilot in Command (PIC) completed the Private Pilot – Airplane (PPR) course in 2011, at *Aeroclube Minas Gerais*.

1.5.3. Category of licenses and validity of certificates.

The PIC held a PLA License (Airline Transport Pilot – Airplane) and had valid ratings for MNTE (Single Engine Land Airplane), MLTE (Multiengine Land Airplane), IFRA (Instrument Flight – Airplane), and INVA (Flight Instructor – Airplane).

1.5.4. Qualification and flight experience.

According to data gathered from the pilot's digital CIV on the Integrated Civil Aviation Information System (SACI) of the National Civil Aviation Agency (ANAC), the PIC's latest recorded flight occurred on January 30, 2021.

Considering the flights performed within the 90 (ninety) days prior to the date of the occurrence, the Investigation Committee concluded that the PIC met the recency of experience criteria established in the Brazilian Civil Aviation Regulation (RBAC) No. 61, Amendment No. 13, Section 61.21 (a)(1)(ii).

The pilot was qualified and experienced in the type of flight.

1.5.5. Validity of medical certificate.

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

1.6. Aircraft information.

The Serial Number (SN) 28-8016342 aircraft was manufactured in 1982 by Piper Aircraft, Inc., and registered under the Private Air Service (TPP) category.

The CVA (Airworthiness Inspection Certificate) had expired on August 6, 2019.

The records of the airframe, engine, and propeller logbooks were not up to date.

The aircraft's latest inspection, an Annual Maintenance Inspection (IAM), was performed on August 6, 2019, by the Maintenance Organization (OM) *TBA – Tecnologia Brasileira de Aeronáutica S.A.*, in *Pará de Minas*, state of *Minas Gerais*.

The Investigation Team was not provided with the mandatory flight time records from the aircraft's logbook. Therefore, it was not possible to determine the number of flight hours accumulated since the last inspection.

1.7. Meteorological information.

According to witness reports, visibility exceeded 10 km with no restrictions. It was reported that approximately three oktas of the sky was covered with cloud, with an estimated base of 6,000 ft.

Additionally, the Investigation Team had access to video footage from the hotel's security cameras, as referenced in item 1.18 – Operational Information of this Report. The recorded footage was consistent with witness statements and indicated that the meteorological conditions at the aerodrome were above the minimums required for the proposed flight under VFR (Visual Flight Rules).

1.8. Aids to navigation.

NIL.

1.9. Communications.

NIL.

1.10. Aerodrome information.

SWVW was a private aerodrome operating VFR during daytime periods. It had an asphalt-sealed runway, with thresholds 06/24, measuring 730 meters x 14 meters, situated at an elevation of 2,589 ft.

The aerodrome had an approved Basic Aerodrome Protection Zone Plan (PBZPA) and an Air Navigation Procedures Protection Zone Plan (PZPPNA), as per Department of Airspace Control (DECEA) Ordinance No. 123/ICA, dated April 11, 2018.

No natural or man-made objects were identified that exceeded the obstacle limitation surfaces defined in the PBZPA for SWVW.

1.11. Flight recorders.

Not required and not installed.

1.12. Wreckage and impact information.

According to physical evidence at the impact site and footage from security cameras, the aircraft was in a turn when it collided with a structure near the leisure area of the Furnaspark Resort and came to rest inside the hotel's swimming pool (Figure 2).

Figure 2 – Site of the aircraft's first impact.

The aircraft's final resting point was located approximately 120 meters from the threshold of Runway 06 at SWVW.

Signs of the aircraft's collision with structures and the ground extended over about 30 meters from the initial impact point – against the pergola – until the complete stop of the main fuselage assembly. The extent of damage to objects on the ground suggests that the aircraft had low horizontal speed at the moment of impact.

The right wing separated from the aircraft moments before it came to a complete stop and was found 18 meters away from the fuselage. Damage was observed along the entire lower section of the aircraft. Due to the extent of the damage, there was a fuel leak into the swimming pool where the aircraft came to rest (Figure 3).

Figure 3 – Frontal view of the aircraft at the accident site.

The fuel selector was in the R TANK position, indicating that the aircraft was drawing fuel from the right tank at the time of the accident. It was observed that the L TANK position on the fuel selector lacked its identification marking.

1.13. Medical and pathological information.

1.13.1. Medical aspects.

There was no evidence that physiological conditions or incapacitation affected the PIC's performance.

1.13.2. Ergonomic information.

NIL.

1.13.3. Psychological aspects.

The investigative elements related to psychological aspects are consolidated within the factual data presented in item 1.18 (Operational Information). This approach was adopted because, in this occurrence, human and operational factors were intrinsically related, and the psychological evidence emerged organically from the documented operational context. Therefore, keeping them linked to the other facts contributes to a comprehensive understanding of the accident.

1.14. Fire.

There was no fire.

1.15. Survival aspects.

The first attempt to rescue the victims was made by individuals who were at the hotel, near the crash site. The pilot and passengers were rescued by people who witnessed the forced landing.

According to the Police Report, firefighters from the of the state of Minas Gerais Fire Department arrived at the scene approximately 15 minutes after the accident and found the victims already outside the aircraft, where they received initial medical attention.

1.16. Tests and research.

The SN L-9774-39A Lycoming O-320-D3G engine, which powered aircraft PR-NEX, was examined, removed, and installed in another aircraft that served as a platform for functional testing. Technicians from the Investigation Committee conducted the procedure (Figure 4).

Figure 4 – Left side view of the engine installed in another aircraft for testing.

During the work performed, one observed that the engine had no severe damage resulting from the accident in which the aircraft was involved. For the functional test, the technicians carried out only checks that would not alter the engine's characteristics compared to the day of the event.

Such checks included verifying the proper operation of the carburetor, which was found to have a clean, uncontaminated fuel inlet filter. A drainage was performed, and a significant amount of water was removed from inside the carburetor bowl. In addition to the carburetor, the lubricant oil level, upper spark plugs, magneto ignition, and cylinder compression were checked. These items presented no discrepancies.

The engine, already installed in another aircraft, was transported to the ramp of the maintenance company for testing.

Initially, one started the engine and kept it at approximately 1,300 RPM for warm-up. After the engine reached the operating temperature, the RPM was increased to 1,600 for the magneto check, which was satisfactorily completed.

Then, the engine was set to maximum RPM and remained in that condition for 9 minutes without abnormalities (Figure 5).

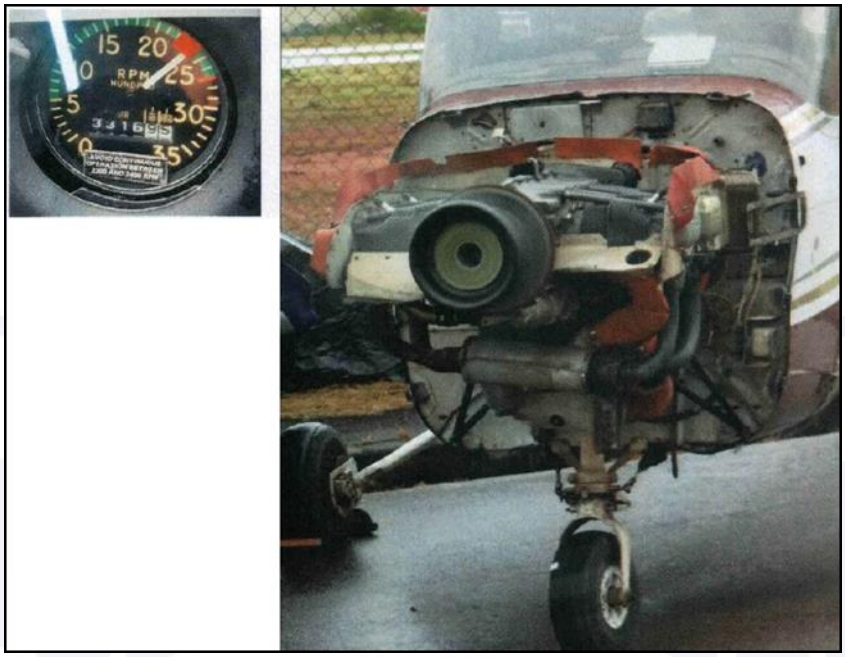

Figure 5 – Engine operating at maximum RPM.

When one reduced the throttle to idle and then increased it again to maximum RPM, the engine exhibited a malfunction. One noted that the engine operated irregularly every time it was accelerated.

After this test, the carburetor was removed for inspection. Upon removal, a foreign object was found inside the carburetor venturi (Figure 6).

Figure 6 – Images of the foreign material lodged in the carburetor venturi.

After the removal of the foreign material and subsequent cleaning of the carburetor, it was reinstalled on the engine. One then started the engine again and operated it for an additional 10 minutes without any signs of abnormalities. It remained at maximum RPM and was subsequently throttled down and up several times. No further abnormalities or discrepancies were observed that could lead to malfunction.

The foreign material lodged in the carburetor venturi was a piece of fabric located in the air passage to the carburetor. It had been stuck in the hot air muff and was carried into the carburetor by the airflow.

The end of the fabric caused a disturbance in the airflow and fuel mixture feeding the engine. This led to the malfunction observed, resulting in a loss of engine power.

Figure 7 – (A) Fabric found inside the carburetor – (B) Fabric from the aircraft fuselage.

The investigation team observed that the anti-friction fabric located on the left side of the aircraft fuselage – where the engine cowling rested – showed clear signs of wear (Figure 8).

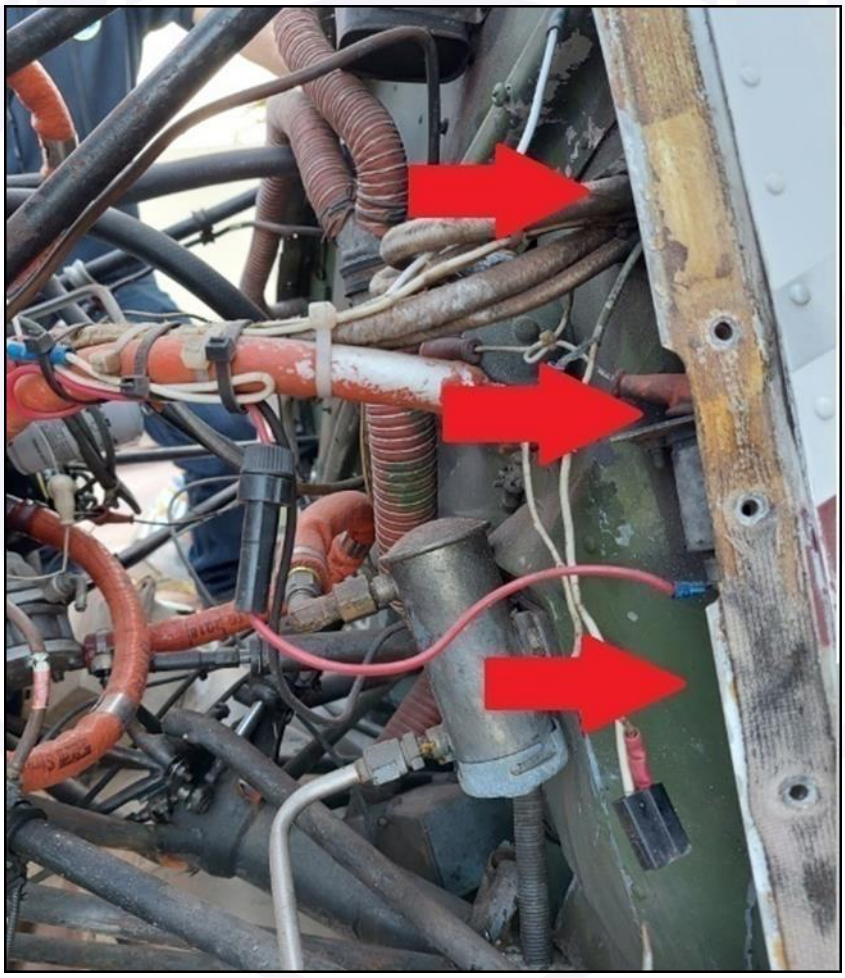

Figure 8 – Area with worn anti-friction fabric.

1.17. Organizational and management information.

NIL.

1.18. Operational information.

This was a repositioning flight operating under Special Flight-Authorization (AEV) No. 88/2021/GTOM/GCAC/SPO issued by ANAC, in the name of *Axial Aviação Ltda.*, Certificate 0210-02/ANAC.

The flight was conducted in accordance with the requirements established in RBAC 91, Amendment 02, “General Operating and Flight Rules for Civil Aircraft,” with an AEV issued under the provisions of RBAC 21, Amendment No. 06, “Certification of Aeronautical Products and Articles,” in effect at the time. Section 21.197 of that regulation established the following:

> […]
>
> 21.197 Special Flight Authorization
>
> (a) A special flight-authorization may be issued for an aircraft that temporarily does not meet all applicable airworthiness requirements but is still considered safe for flight. The following purposes are permitted:
>
> **(1) relocation of the aircraft to a base where repairs, modifications, or maintenance will be performed, or to a base where the aircraft will be stored; (emphasis added)**
>
> [...]

The AEV issued for aircraft PR-NEX included operational limitations and remarks, among which the following stood out:

> […]
>
> V – ADDITIONAL OPERATIONAL LIMITATIONS
>
> [...]
>
> 4. **The flight shall be conducted so as to avoid areas that have heavy air traffic or that might create hazardous exposure to persons or property, being the operator the responsible for the routes and airfields chosen for this flight. (Emphasis added)**
>
> [...]
>
> VI – REMARKS
>
> **FLIGHT WITHOUT PASSENGERS AND/OR CARGO. DAYTIME VFR / MINIMUM CREW. (Emphasis added)**

At the time of the occurrence, there was no Normative Instruction (IN) issued by ANAC providing guidance on the procedures for requesting and conducting operations under an AEV. The guidance was provided solely within the very Authorization.

The AEV did not certify the aircraft’s airworthiness; it only allowed it to be flown for the purpose of repositioning. The AEV would only be issued by ANAC once the applicant demonstrated that the aircraft was in a safe-for-flight condition. A Special Flight-Authorization did not exempt the aircraft from complying with the applicable requirements of RBAC Nos. 43 and 91.

According to the AEV, the aircraft was authorized to perform a flight originating from SNPA (*Pará de Minas* Aerodrome, state of Minas Gerais), bound for SBBP.

The referred document also stated that the purpose of the flight was to reposition the aircraft to a base where repairs, modifications, or maintenance would be carried out, or to a base where the aircraft would be stored.

According to the PIC’s statement, the aircraft was being repositioned for maintenance at an OM in *Bragança Paulista*, state of *São Paulo*.

The PIC reported that, on the day before the accident, he had performed a check flight and felt confident to proceed with the repositioning flight from SNPA to SBBP, since the aircraft was in perfect condition.

With respect to the operational limitations set forth in the AEV, no evidence was found indicating that the risk of exposing people or property was evaluated when selecting SWVW as the aerodrome for the operation.

The Investigation Committee was not presented with the aircraft logbook, cargo manifest (with weight and balance data), flight plan, or any other document that could confirm the flight planning related to the accident.

Regarding the referred planning, the PIC informed that after departing SNPA, a technical stop was made at SNDV (*Brigadeiro Antônio Cabral* Aerodrome in Divinópolis, MG) for refueling, after which the flight continued to SWVW.

At SNDV, the aircraft received 160 liters of aviation gasoline, being 60 liters in the left wing and 100 liters in the right wing. The combined weight of the two passengers on board was 200 kilograms, with an additional 30 kilograms of baggage. Based on these reported numbers, the PIC stated that the aircraft was within the allowable weight and balance limits.

During interviews, the PIC reported that during the leg between SNDV and SWVW, the engine began operating with a “rough” performance. The Pilot’s Operating Handbook (POH) for the aircraft included procedures for this condition (Figure 9).

ENGINE ROUGHNESS

Carburetor heat ..... ON

If roughness continues after one min:
Carburetor heat ..... OFF
Mixture ..... adjust for max. smoothness
Electric fuel pump ..... ON
Fuel selector ..... switch tanks
Engine gauges ..... check
Magneto switch ..... L. then R then BOTH

If operation is satisfactory on either one, continue on that magneto at reduced power and full RICH mixture to first airport.

Prepare for power off landing.

Figure 9 – Procedures in the POH for rough engine operation.

According to the PIC’s account, the prescribed procedures were not carried out, and he proceeded to land at SWVW, which was completed uneventfully.

After takeoff from SWVW toward SBBP, upon passing approximately 250 ft of altitude, the PIC reported that the aircraft experienced a drop in RPM followed by a loss of power. As a result, he attempted to return to the runway by executing a right-hand turn, maintaining a speed of approximately 70 kt.

The Investigation Committee had access to video recordings from the hotel’s surveillance cameras, which captured the moments from takeoff to the forced landing in the hotel swimming pool.

Based on the video footage, it was not possible to determine the aircraft’s exact flight path. However, one observed that 64 seconds elapsed between the crossing of the Runway 06 threshold during takeoff and the initial impact with the hotel structures (Figure 10).

Figure 10 – Images of the takeoff and first impact of the aircraft.

According to the available recordings, moments before the impact, the aircraft was flying on a trajectory perpendicular to the runway at SWVW.

For cases of power loss during takeoff, the aircraft's POH read that, if there was insufficient runway remaining, the pilot should land straight ahead, maintaining a safe speed and executing only small turns to avoid obstacles, while configuring the flaps as necessary (Figure 11).

ENGINE POWER LOSS DURING TAKEOFF

If sufficient runway remains for a normal landing, land straight ahead.

If insufficient runway remains:
Maintain safe airspeed
Make only shallow turn to avoid obstructions
Flaps as situation requires

If sufficient altitude has been gained to attempt a restart:
Maintain safe airspeed
Fuel selector ..... switch to tank containing fuel
Electric fuel pump ..... check ON
Mixture ..... check RICH
Carburetor heat ..... ON
Primer ..... locked
If power is not regained, proceed with power off landing.

Figure 11 – Procedure for power loss during takeoff.

According to the PIC, upon recognizing the power loss, he chose not to switch fuel tanks, as takeoff had been performed with the selector set to the right tank, which contained more fuel.

Additionally, he reported that the electric fuel pump was on during takeoff, and that he attempted to reset it at least three times during the power loss, without success.

1.19. Additional information.

NIL.

1.20. Useful or effective investigation techniques.

NIL.

2. ANALYSIS.

This was a repositioning flight from SNPA to SBBP, operating under an AEV (Special Flight-Authorization), in accordance with the requirements established in RBAC 21.

The aircraft, operated by a private individual, was registered under the TPP (Private Air Service) category.

Although the aircraft's CVA was expired, and the records of the airframe, engine, and propeller logbooks were out of date, the mentioned AEV issued by ANAC authorized the flight so that the aircraft could be taken to a Maintenance Organization (OM) in *Bragança Paulista*.

The PIC was qualified and had experience with the type of flight.

The AEV contained operational limitations, emphasizing the need to avoid areas of high air traffic and locations that could expose people or property to risk. The responsibility for choosing appropriate routes and takeoff and landing aerodromes rested with the operator.

Besides, the same AEV stipulated that the flight should be conducted without passengers. However, on the accident flight, there were two passengers on board, which not only demonstrated an improper posture but also constituted non-compliance with the restrictions imposed by the Civil Aviation Authority, thereby exposing individuals to risk during that operation.

According to the PIC, the planning and execution of the repositioning flight from SNPA to SBBP involved a technical stop at SNDV for refueling, followed by another stop at SWVW.

SWVW was selected as a stopover aerodrome; however, no evidence was found indicating that an adequate risk assessment had been conducted regarding the exposure of persons or property when operating at that location.

On the segment between SNDV and SWVW, the PIC reported that the aircraft engine began operating "roughly," but he did not perform the procedures outlined in the Pilot's Operating Handbook (POH) of the manufacturer for such a condition. Regarding this segment, it was noted that the PIC demonstrated inadequate assessment of certain operational parameters of the aircraft – even though he was qualified to operate it – which could have mitigated the risks, had the correct actions been taken. Nevertheless, the landing at SWVW took place uneventfully.

The AEV did not certify the aircraft's airworthiness but only authorized the flight for repositioning purposes. It was issued only after the applicant provided the necessary information to allow ANAC to determine that the aircraft was safe to operate.

Thus, considering that the engine showed abnormal behavior during the previous leg, it would have been appropriate for the PIC to contact the Maintenance Organization that requested the AEV to verify whether the repositioning flight should continue after the landing at SWVW – especially since the AEV was issued based on the evaluation of the aircraft's condition by that OM. However, no such consultation was made by the PIC following the engine's abnormal performance between SNDV and SWVW.

According to the PIC, during takeoff from SWVW, at a height of approximately 250 ft, the aircraft experienced a drop in RPM followed by a loss of power. The PIC attempted a right-hand turn to return to the runway, instead of landing straight ahead as recommended by the POH in the event of insufficient runway remaining. The POH emphasized the importance of maintaining a safe airspeed and performing only slight turns to avoid obstacles. This decision again reflected poor judgment on the part of the PIC.

There was no evidence that the meteorological conditions at SWVW contributed to the occurrence, as the hotel's security camera footage and witness statements indicated that weather conditions exceeded the minimums required for the intended VFR flight. No natural or man-made objects were identified that exceeded the obstacle limitation surfaces outlined in the PBZPA for SWVW.

Regarding the accident flight, the Investigation Committee was not provided with documents such as the aircraft logbook, cargo manifest, weight and balance sheet, flight plans, or any other documentation that could validate the flight planning. The absence of these records further revealed actions and omissions that demonstrated an improper posture through the failure to comply with established procedures.

Without the appropriate documents, it was not possible to confirm whether the planned operation was executed as intended, or whether last-minute changes were made that could have contributed to the accident. The lack of formal records related to the flight made it impossible to conduct a detailed analysis of how such factors may have interfered with the occurrence.

According to accounts from PIC, the aircraft was within operational limits. However, without supporting documentation, it was also not possible to verify the accuracy of this claim or ensure that all weight and balance calculations had been correctly performed. The absence of complete and accurate documentation reflected poor adherence to recommended safety practices and inadequate planning for the flight in question.

It is worth noting that no recent records regarding flight time were presented, making it impossible to identify maintenance interventions performed in the recent past prior to the occurrence. It was also not possible to determine the actual number of hours flown by the aircraft.

The absence of such records indicated that the aircraft had not undergone proper preventive and/or corrective maintenance, which contributed to the chain of events that culminated in the accident.

During the engine tests and examinations, one found that the oil level, spark plugs, magneto ignition, and cylinder compression were all within normal parameters.

However, when the throttle was reduced to idle and then increased back to maximum RPM, the engine exhibited a failure. It was noted that the engine operated irregularly whenever it was accelerated.

At the inspection of the carburetor, one found a piece of fabric lodged in the venturi. The fabric was removed, the carburetor cleaned, and reinstalled on the engine. Then, one tested the engine was and it operated normally without failures or abnormalities.

The fragment found obstructing the carburetor may have originated from a piece of anti-friction fabric visibly worn and poorly positioned on the left side of the fuselage, where the engine cowling rested.

This improper positioning and the undetected or uncorrected wear by maintenance personnel may have allowed the fabric to be sucked into the airflow and carried into the carburetor, disrupting the normal airflow and fuel mixture. This disruption directly caused the engine failure and subsequent power loss during flight.

The presence of that fabric fragment in the carburetor venturi indicated a failure in preventive and corrective maintenance procedures, including deficiencies in ensuring the integrity of components that could affect engine performance.

Based on the available evidence, it is likely that the PIC still had control of the aircraft in the moments leading up to the impact, as the aircraft was in a turn and, despite the reported power loss, there still appeared to be maneuvering margin to deliberately select the site for the forced landing.

The analysis of the hotel’s security camera recordings provided a critical perspective on the events leading up to the aircraft accident. The footage captured the takeoff and subsequent forced landing in the hotel’s swimming pool, although it did not allow for a precise view of the entire flight path up to the moment of impact. However, the 64-second

interval between takeoff from the threshold of Runway 06 and the initial impact with hotel structures was significantly long for the events described by the PIC.

This time interval suggested that there were more actions or maneuvers performed than a simple immediate attempt to return to the runway following a power loss. If the engine indeed failed shortly after takeoff, at around 250 ft as reported by the PIC, the aircraft would typically have had little time to maneuver before ground impact.

The trajectory observed prior to the impact, which was perpendicular to the runway, indicated that the PIC conducted a significant overflight of the area surrounding the aerodrome – an atypical pattern for a direct and immediate response to a loss of engine power right after takeoff.

3. CONCLUSIONS.

3.1. Findings.

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

b) the PIC held valid ratings for MNTE (Single-Engine Land Airplane), MLTE (Multiengine Land Airplane), IFRA (Instrument Flight – Airplane), and INVA (Flight Instructor – Airplane);

c) the PIC was qualified and experienced in the type of flight;

d) the aircraft's CVA (Airworthiness Inspection Certificate) had been expired since August 6, 2019;

e) the records of the airframe, engine, and propeller logbooks were not up to date;

f) the aircraft held an AEV (Special Flight-Authorization) for repositioning from SNPA to SBBP in accordance with RBAC 21;

g) the aircraft was being repositioned for maintenance at a Maintenance Organization located in *Bragança Paulista*, state of *São Paulo*;

h) the PIC stated that the aircraft was within weight and balance limits;

i) security camera footage and witness statements indicated that weather conditions at the aerodrome were above the minimums required for the intended flight;

j) the PIC reported taking off from SNPA, making a technical stop at SNDV for refueling, and then proceeding to SWVW;

k) the PIC stated that during the leg between SNDV and SWVW, the engine began operating "roughly," but he did not perform the manufacturer's prescribed procedures, and landed normally at SWVW;

l) during takeoff from SWVW to SBBP, at a height of approximately 250 ft, the PIC reported a drop in RPM followed by a loss of power;

m) following the engine power loss, the PIC attempted to return to the runway via a right-hand turn;

n) during the right-hand turn to return to the runway, the aircraft's right wingtip struck a pergola, and the aircraft crashed into the swimming pool of Furnaspark Resort Hotel;

o) no natural or man-made objects were identified that exceeded the obstacle limitation surfaces defined in the PBZPA for SWVW;

p) during post-accident functional testing of the engine, a fragment of fabric was found lodged in the carburetor venturi of the aircraft's engine;

q) the aircraft sustained substantial damage; and

r) the PIC and the passengers sustained minor injuries.

3.2. Contributing factors.

- **Attitude – a contributor.**

The accident flight was carrying two passengers, in violation of the restriction imposed by the Civil Aviation Authority in the issued AEV (Special Flight-Authorization), thereby exposing individuals to risk during the operation. This action, on the part of the PIC, reflects a deficiency in the way he thought, felt, and reacted, leading to an improper posture due to disregard for the prescribed procedures.

- **Piloting judgment – a contributor.**

During the leg between SNDV and SWVW, the PIC reported that the aircraft's engine began to operate "roughly," yet he did not perform the procedures prescribed in the Pilot's Operating Handbook (POH) of the manufacturer for that type of condition.

The loss of power during takeoff from SWVW, followed by the attempt to return to the runway – rather than landing straight ahead – was contrary to POH recommendations.

These decisions demonstrated inadequate assessments by the pilot regarding certain parameters related to the operation of the aircraft, despite being qualified to operate it.

- **Aircraft maintenance – a contributor.**

It was not possible to identify the maintenance interventions performed in the recent past prior to the occurrence, nor was it possible to determine the actual number of hours flown by the aircraft. The lack of such records indicated that the aircraft had not undergone proper preventive and/or corrective maintenance, which contributed to the chain of events that led to the accident.

The presence of a fragment of fabric in the carburetor venturi indicated non-compliance with preventive and corrective maintenance procedures, including failures related to the integrity of components that affected engine performance.

- **Flight planning – undetermined.**

The fact that crucial documents such as the cargo manifest, weight and balance sheet, or any other documentation capable of validating the operational planning for that flight were not submitted to the Investigation Committee suggests that the preparation process may not have included procedures essential to operational safety.

- **Other – Compliance with Regulations – a contributor.**

The accident flight was carrying two passengers, a violation of the restriction imposed by the Civil Aviation Authority in the issued AEV, thereby exposing individuals to risk during the operation.

In addition, the absence of records such as the aircraft logbook, cargo manifest, weight and balance sheet, and flight plan demonstrated the operator's noncompliance with aviation regulations applicable to the flight in question.

4. SAFETY RECOMMENDATIONS

None.

5. CORRECTIVE OR PREVENTATIVE ACTION ALREADY TAKEN.

On March 28, 2025, ANAC published Supplemental Instruction (IS) No. 21-197-001, Revision A, providing guidance regarding the AEV (Special Flight-Authorization).

On July 29th, 2025.