COMANDO DA AERONÁUTICA

CENTRO DE INVESTIGAÇÃO E PREVENÇÃO DE ACIDENTES AERONÁUTICOS

FINAL REPORT
A-149/CENIPA/2020

OCCURRENCE:	**ACCIDENT**
AIRCRAFT:	**PP-MSA**
MODEL:	**206B**
DATE:	**11DEZ2020**

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 is the Final Report of the accident involving the 206B aircraft, registration PP-MSA, on 11 December 2020. The accident was typified as “[CTOL] Collision with an obstacle during takeoff and landing.”

While on the traffic circuit for landing, the aircraft collided with cables of a power transmission line, resulting in loss of control and subsequent fall into a river.

Investigation later revealed that the flight period had extended until after sunset, and that the destination was not certified for nighttime VFR operations.

The aircraft sustained substantial damage.

The pilot did not survive the crash.

Being the USA the State of aircraft design and manufacture, an Accredited Representative of the National Transportation Safety Board (NTSB) 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
ATS	Air Traffic Services
CENIPA	Brazil's Aeronautical Accidents Investigation and Prevention Center
CIV	Pilot Logbook
CMA	Aeronautical Medical Certificate
CVA	Airworthiness Verification Certificate
DCTA	Department of Science and Aerospace Technology
DECEA	Department of Airspace Control
HMNC	Conventional Single-Engine Helicopter Class Rating
HMNT	Single-Engine Turbine Helicopter Class Rating
ICA	Command of Aeronautics' Instruction
IFR	Instrument Flight Rules
IFRH	IFR Flight Rating (Helicopter)
IMC	Instrument Meteorological Conditions
METAR	Meteorological Aerodrome Report
PCH	Commercial Pilot License (Helicopter)
PIC	Pilot in Command
PPH	Private Pilot License (Helicopter)
SBJR	ICAO location designator – *Jacarepaguá* Aerodrome, *Rio de Janeiro*, RJ
SBSP	ICAO location designator - Congonhas Aerodrome, *São Paulo*, SP
SDAG	ICAO location designator - *Angra dos Reis* Aerodrome, RJ
SIVA	ICAO location designator - *Ilha do Cavaco* Heliport, *Angra dos Reis*, RJ
SIPAER	Aeronautical Accidents Investigation and Prevention System
SN	Serial Number
SPECI	Aviation Selected Special Weather Report
TPX	Public Air Transport Aircraft Registration Category
UTC	Universal Time Coordinated
VFR	Visual Flight Rules
VMC	Visual Meteorological Conditions

1. FACTUAL INFORMATION.

Aircraft	**Model:** 206B **Registration:** PP-MSA **Manufacturer:** *Bell Helicopter*	**Operator:** *Blue Sky Táxi Aéreo Ltda.-ME*.
Occurrence	**Date/time**: 11DEZ2020 - (UTC) **Location:** Close to *Hotel do Bosque*. **Lat.** 23°01'18"S. **Long.** 044°31'39"W. **Municipality – State:** *Angra dos Reis – Rio de Janeiro*.	**Type(s):** [CTOL] Collision with obstacle(s) during take-off and landing

1.1. History of the flight.

At around 21:12 UTC, the aircraft took off from SIVA (*Ilha do Cavaco* Heliport, *Angra dos Reis*, State of *Rio de Janeiro*) bound for *Hotel do Bosque* (also located in *Angra dos Reis*) on a flight with 01 POB (pilot).

At 21:43 UTC, while on the approach for landing, the aircraft collided with a power transmission line. The collision caused loss of control of the helicopter, and it crashed into a river.

The aircraft sustained substantial damage, and the pilot suffered fatal injuries.

1.2. Injuries to persons.

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

1.3. Damage to the aircraft.

The aircraft sustained widespread substantial damage.

1.4. Other damage.

There was breakage of the cables of a power transmission line, causing electric power outage in the locality.

1.5. Personnel information.

1.5.1. Crew's flight experience.

	PIC
Total	435:06
Total in the last 30 days	Unknown
Total in the last 24 hours	Unknown
In this type of aircraft	290:31
In this type in the last 30 days	Unknown
In this type in the last 24 hours	Unknown

NB.: According to the operator, the aircraft logbook was destroyed when the helicopter submerged in the river. In the same way, the PIC's pilot logbook (CIV) disappeared.

Thus, the source of the data presented above was the digital CIV of the Integrated Civil Aviation Information System (SACI), with records logged by 11th of May 2019.

1.5.2. Personnel training.

The Pilot in Command (PIC) did the Private Pilot - Helicopter (PPH) course in 2013 at the *Blue Sky Escola de Aviação Civi*l, *Rio de Janeiro*.

1.5.3. Category of licenses and validity of certificates.

The PIC held a PCH license (Commercial Pilot – Helicopter), and had valid ratings for HMNC (Single-Engine Conventional Helicopter) and HMNT (Single-Engine Turbine Helicopter). He did not have an IFRH* rating *(IFR Flight – Helicopter).

1.5.4. Qualification and flight experience.

The operating company did not present the control of the PIC's flight hours. Therefore, it was not possible to verify his recent experience in the type of flight.

1.5.5. Validity of medical certificate.

The PIC had a valid CMA (Aeronautical Medical Certificate).

1.6. Aircraft information.

The serial number 4566 aircraft was manufactured by Bell Helicopter in 2002, and was registered in the Non-Regular Public Air Transport Aircraft Registration Category (TPX).

The Airworthiness Verification Certificate (CVA) was valid.

Both the airframe and engine logbooks had up-to-date records.

The last inspection of the aircraft, ("100 hours" type) was carried out on 09 October 2020 by the *Airtech Soluções Aeronáuticas* maintenance organization (OM), *Rio de Janeiro*, RJ. The helicopter flew 56 hours and 10 minutes after the referred inspection.

The last comprehensive inspection of the aircraft,("1,200 hours" type) was carried out on 25 August 2020 by the *Airtech Soluções Aeronáuticas* OM. The helicopter flew 83 hours and 40 minutes after the comprehensive inspection.

The aircraft did not have certification for flights in Instrument Meteorological Conditions.

1.7. Meteorological information.

The METAR (Meteorological Aerodrome Report) and the SPECI (Aviation Selected Special Weather Report) of SDAG (located at a distance of 12 NM from the crash site) contained the following information:

METAR SDAG112100Z AUTO 06005KT8000 RA FEW019 23/22 Q1014=

METAR SDAG 112200Z AUTO 20004KT 170V250 7000 RA FEW010 23/22 Q1014=

SPECI SDAG 112135Z AUTO 00000KT 9999 -RA NSC 23/22 Q1014 RERA=

SPECI SDAG 112139Z AUTO 00000KT 4500 -RA NSC 23/22 Q1014 RERA=

There was a reduction of the visibility between the 21:00 UTC and 22:00 UTC METARs (from 8,000 to 7,000 m).

Besides, the SPECI of 21:39 UTC (closest to the time of the occurrence) indicated visibility of 4,500 m.

Notwithstanding the degradation of the meteorological conditions, one verified that the weather was compatible with VFR flights, according to item 3.1.2 of the Command of Aeronautics' Instruction no. 100-4 (ICA 100-4), of 2018, which was in force at the time of the accident:

[...]

Outside of controlled airspace, above 3000 feet of altitude or 1000 feet of height over the terrain, whichever is greater, helicopter VFR flights shall only be carried out if, simultaneously and continuously, the following conditions are met:

a) remain in flight visibility conditions equal to or greater than 3000m;

b) remain at least 1500m horizontally and 500 feet vertically from clouds or any other meteorological formation of equivalent opacity;

[...]

1.8. Aids to navigation.

NIL.

1.9. Communications.

NIL.

1.10. Aerodrome information.

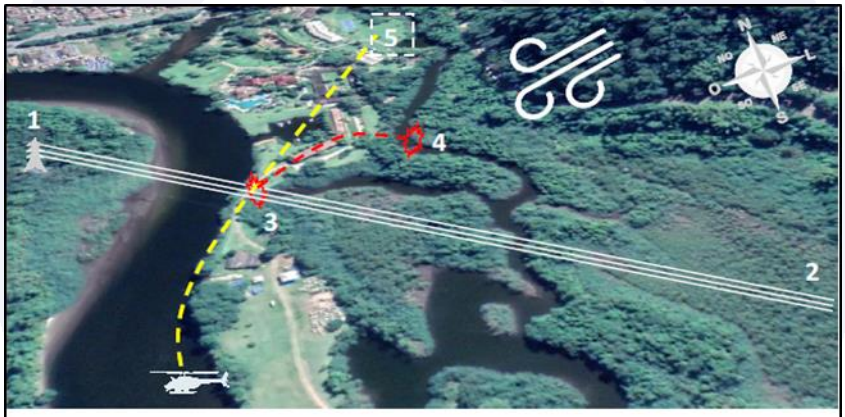
The occurrence was outside of aerodrome area.

1.11. Flight recorders.

Neither required nor installed.

1.12. Wreckage and impact information.

The impact between the aircraft and the high voltage transmission line occurred at 21:43 UTC, at a distance of approximately 380 m from the planned landing position at *Hotel do Bosque* (Figure 1).



LEGENDA

1	Torre de transmissão		Direção do vento (060/05KT)
1-2	Fiação de transmissão elétrica		Norte magnético (declinação 22º 24' W)
3	Ponto do primeiro impacto		Rota pretendida
4	Crash site (23º 01' 18.3" S 044º 31' 39,2"W)		Rota após primeiro impacto
5	Ponto pretendido de pouso (campo de futebol no Hotel do Bosque)		

Figure 1 - Croquis of the occurrence.

After colliding with the cables of the power transmission line, the aircraft crashed into a river and submerged (Figures 2 and 3).

Figure 2 - Final position of the PP-MSA in the river.

Figure 3 - Overview of the damage sustained by the helicopter (detail of the transmission line towers in the background).

The aircraft's main rotor and engine separated at the impact with the riverbed, and remained close to the airframe in the crash site.

On the aircraft skids, it was possible to observe points of impact with the cables of the power transmission line (Figure 4).

Figure 4 - Marks of the impact against the transmission line cables.

1.13. Medical and pathological information.

1.13.1. Medical aspects.

There was no evidence that issues of physiological nature or disability might have affected the crewmember's performance.

1.13.2. Ergonomic information.

NIL.

1.13.3. Psychological aspects.

The PIC was described as an organized and easy-going person. The company regarded him as an excellent professional, who was detail-oriented and meticulous with the equipment and its pilotage. He had experience on the route, as he had already landed in the locality on a number of occasions.

The investigators verified that, during the flight, the PIC made contact with a few people via message applications, which might be indicative that he was self-confident.

At the intended landing site, there would be a party for one of PIC's relatives, and it is possible that he was motivated to land there to participate in the event.

1.14. Fire.

There was no fire.

1.15. Survival aspects.

The only occupant of the aircraft did not survive the crash.

1.16. Tests and research.

The DCTA (Department of Science and Aerospace Technology) analyzed the engine with the purpose of verifying the engine power conditions at the time of the accident. The conclusion was that the engine was operational, providing adequate rated power for the flight regime, and there were no signs of failure in that component.

The instruments were subject to black-light analysis for verification of marks of impact due to deceleration, to determine the readings of the primary instruments at the time of the accident. However, the tests were inconclusive, as the marks were not clear enough for the engineers to determine the readings.

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 purpose of the flight was to transport passengers from SBJR (*Jacarepaguá* Aerodrome, *Rio de Janeiro*, RJ) to two distinct localities: first, a location outside of aerodrome area on *Ilha Grande*, *Angra dos Reis*, RJ, and then to SIVA (*Ilha do Cavaco* Heliport, *Angra dos Reis*, RJ).

The PIC was at SBJR waiting for the passengers, as they would arrive on another aircraft, which would fly from SBSP to SBJR. However, due to deteriorating weather conditions, that aircraft attempted to divert to SDAG as an alternate aerodrome.

However, because of the degradation of the meteorological conditions in the region, the aircraft coming from SBSP was not able to land at SDAG, and proceeded to SDPA (*Fazenda Portobello* Aerodrome, *Angra dos Reis*, RJ) where it landed successfully.

Therefore, the PP-MSA flight route changed to taking off from SDPA, disembarking some of the passengers on *Ilha Grande*, and making the final stop at SIVA.

Before the takeoff, the PIC asked the operator for authorization to fly one more leg in addition to the one originally planned, with introduction of an extra segment between SIVA and *Hotel do Bosque*, in *Angra dos Reis*, where he would stay overnight and return to base on the following day.

As for operation in non-registered landing and take-off areas, the RBAC-135 ("Public Air Transport Operations with Airplanes with Maximum Certified Configuration of Seats for Passengers of up to 19 Seats and Maximum Paid Cargo Capacity of up to 3,400 kg (7,500 Lb.), or Helicopters") established the following requirements in the letter (d) of the section 135.229:

> [...]
>
> (d) Helicopter landings and takeoffs in unregistered areas, or landings and takeoffs in unregistered areas on water, are authorized under certain conditions, as set out in sections 91.329 and 91.331 of RBAC-91, applying the section 135.77 of this regulation in relation to the responsibilities involved.

In the mentioned extra leg, as there was no transport of passengers, the operation of the aircraft was in accordance with the prescriptions of the RBAC-91 (Brazilian Civil Aviation Regulation no. 91 - "General Operation Requirements for Civil Aircraft").

The Section 91.329 of the RBAC-91, cited in the RBAC-135, established the following requirements:

> 91,329 Helicopter landings and takeoffs in unregistered areas
>
> (a) Except as provided in the paragraph 91.102(d) of this Regulation, landings and takeoffs of helicopters in unregistered areas may be carried out under full responsibility of the operator, provided that:
>
> (1) the operation is performed:
>
> (i) in areas:
>
> (A) owned by a private individual;
>
> (B) whose public access is restricted; or
>
> (C) uninhabited, where there are no demarcations or constructions on the ground indicating the presence of people within a radius of 30 meters from the touchdown point (except those people involved with the operation);
>
> (ii) where the final approach and take-off area and the touchdown area are free of obstacles or animals that could compromise the safety of the operation; and
>
> (iii) in areas where any point of the helicopter is at least 30 meters away from any public-access road;
>
> (2) there is no aircraft-fueling operation on site;
>
> (3) there is no prohibition of operation in the selected location;
>
> (4) the operation is carried out under daytime VFR (emphasis added) and in VMC;
>
> (5) the person responsible for the site has authorized the operation or, in the case of uninhabited areas, has not prohibited it; and
>
> 6) the operator performs management of the risks in order to guarantee an acceptable level of risk to the safety of the operation, as well as of the aircraft, its occupants and third parties (emphasis added).

For operation in non-registered landing and take-off areas, the provisions of section 135.77 of the RBAC-135 had to be observed, as they established the following requirement:

> 135.77 Responsibility for operational control
>
> The certificate holder is responsible for the operational control, and must list in the company's general manual, as per the section 135.21 of this Regulation, the name and title of each person authorized by him/her to exercise the operational control.

Since the takeoff and landing would take place at aerodromes devoid of Air Traffic Service providers, and the route of the helicopter was in type-G airspace, the pilot did not have to file any flight plans.

In this sense, the DECEA (Department of Airspace Control) confirmed to the Investigation Committee that there was not a flight plan filed for the route flown by the PP-MSA aircraft. Thus, the take-off time from *Fazenda Portobello* for the flight toward *Ilha do Cavaco* was calculated to be 21:12 UTC, based on information collected from interviewees.

It is worth noting that *Hotel do Bosque* did not have a helipad certified for nighttime VFR operations.

According to the information gathered, the takeoff presumably occurred at 21:12 UTC. The sunset time was 21:36 UTC.

Thus, the PIC had 24 minutes available for flying from *Fazenda Portobello* Aerodrome, making intermediate landings for disembarkment of passengers, and, finally, landing at *Hotel do Bosque*.

A report by the *ENEL* (the company responsible for the network of electric power transmission in the region) pointed out that, at 21:43 UTC, a helicopter collided with cables of a power transmission line, with consequent breakage of the cables.

Near that location, the wreckage of the PP-MSA was located. The helicopter had marks on the skids resulting from the impact against the cables of the transmission line. The aircraft was at a distance of about 200 m from the intended landing site (*Hotel do Bosque*).

Although the PIC's pilot logbook was missing, the Investigation Committee concluded that the he knew the place well, since, in addition to frequently visiting the region, he had already made several flights along the mentioned route.

On that respect, the RBAC-135, in its section 135.63, established that the certificate holder had to keep (in his main administration office or in other places approved by the ANAC) individual records for each of the pilots participating in operations in accordance with that Regulation. The records had to include, among other pieces of information, “the PIC's working-hour and flight-hour records with sufficient detail so as to determine compliance with the flight limitations contained in the Regulation”.

Witnesses reported that the PIC made contact via telephone with a person on the ground during the flight. They also stated having seen the PIC making a low pass and waving to people on the ground.

1.19. Additional information.

NIL.

1.20. Useful or effective investigation techniques.

NIL.

2. ANALYSIS.

Due to degradation of the weather conditions in the region, the route of flight of the PP-MSA was changed so that the aircraft would take off from SDPA, disembark part of the passengers on *Ilha Grande*, and disembark the remaining passengers in SIVA.

The PIC requested authorization from the operator to include, upon completion of the above tasks, one more leg in the original plan, from SIVA to the *Hotel do Bosque*, in *Angra dos Reis*, where he would stay overnight and return to base on the next day.

The investigation verified that the PIC made contact via message applications with some people during the flight, a fact that might indicate a feeling of high self-confidence in flight, contributing to his lowering of attention during the management of the operation.

At the intended landing location, a party for one of the PIC's relatives would take place. Thus, it is possible that he was motivated to land in that place to participate in the event, inducing him to take off from *Ilha do Cavaco* to perform the extra leg, even flying under degraded weather conditions and close to the sunset time.

According to records kept by ENEL, the collision of the PP-MSA against the cables of the power transmission line occurred seven minutes after the sunset time.

The METAR of SDAG, located at a distance of 12 NM from the place of occurrence, indicated rain during the entire period of the flight. The SPECI message of 21:35 UTC indicated decrease in the intensity of the rainfall, and a second SPECI message of 21:39 UTC indicated degradation of the horizontal visibility, from 10 km to 4,500 m.

Although the meteorological parameters did not constitute an impediment to visual flights of helicopters, as discussed in item 1.7, this type of flight required greater attention on the part of the pilot.

Since the weather conditions were restricting visibility at the time of the occurrence, the PIC may have reduced the aircraft speed in order to maintain VMC during the flight, and possibly ended up increasing the planned flight duration.

Despite the fact that the CIV was missing, and the company did not provide information on the pilot's flight hours, one concluded that the PIC knew the place well, since, in addition to frequently visiting the region, he had already made several flights on that route, a possible indication that he felt confident about conduction of that flight. However, it was not possible to confirm the PIC's recent experience, nor his most recent nighttime flights.

In this sense, interviewees reported that the PIC made contact via telephone with a person on the ground during the flight. They observed the helicopter making a low pass, with the PIC waving to people on the ground. These reports indicated that the pilot's attention might have been compromised, reducing the possibility of a timely response to the sighting of the transmission line cables.

The failure in the decision-making process contributed to the accident, due to the crewmember's difficulty in perceiving the possibility of exceedance of the sunset time and reacting appropriately. The investigation committee learned that the aircraft would have taken off for the destination shortly before the sunset time, and that the destination did not have certification for nighttime VFR landings, contrary to the prescriptions of the RBAC-91.

The operation in disagreement with aeronautical regulations in force may imply safety levels below the minimum acceptable ones established by the Brazilian State.

By failing to meet the minimum levels of safety specified by the Brazilian State, one may foster the creation of latent unsafe conditions, the prevention or mitigation of which is only possible through adherence to the very regulation.

3. CONCLUSIONS.

3.1. Findings.

a) the PIC had a valid Aeronautical Medical Certificate (CMA);

b) the PIC had valid HMNC (Single-Engine Conventional Helicopter), and HMNT (Single-Engine Turbine Helicopter) ratings;

c) the PIC did not have an IFRH (IFR Flight - Helicopter) rating;

d) it was not possible to verify the PIC's recent experience in the type of flight;

e) the aircraft had a valid Airworthiness Verification Certificate (CVA);

f) the aircraft was within weight and balance limits;

g) the records of the airframe and engine logbooks were up to date;

h) the meteorological conditions, despite degradation of the weather, were above the minimums for the flight;

i) the destination was not certified for nighttime VFR landings;

j) the helicopter collided with the transmission line cables after sunset;

k) the aircraft crashed into a river;

l) the aircraft sustained substantial damage; and

m) the PIC suffered fatal injuries.

3.2. Contributing factors.

- **Attention – undetermined.**

Telephone contacts during the flight and execution of a low pass under inappropriate conditions indicated that the PIC could have compromised his attention, reducing the possibility of responding to the sighting of the transmission line cables.

- **Attitude – a contributor.**

When flying under unfavorable conditions, performing inappropriate procedures, such as making a telephone call during the flight and performing a low pass, were indications of impulsiveness and improvisation for not being attentive to the VFR procedures.

- **Motivation – undetermined.**

It is possible that the PIC was highly interested in flying the leg because of a family event that would take place at the location of landing.

- **Decision-making process – a contributor.**

Following inadequate judgment, the PIC made the decision to conduct a flight that would exceed the sunset time, and would land in a place not certified for nighttime VFR operations, thus contributing to the occurrence in question.

4. SAFETY RECOMMENDATIONS

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 consonance with the Law n°7565/1986, recommendations are made solely for the benefit of 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".

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

A-149/CENIPA/2020 - 01 **Issued on 09/22/2023**

Work with *Blue Sky Táxi Aéreo Ltda*., in order to verify that the company and its pilots operate in accordance with the requirements established in the RBAC-135, in particular with regard to the operational control of their flights, and the keeping of individual records for each one of the pilots.

5. CORRECTIVE OR PREVENTATIVE ACTIONS ALREADY TAKEN.

NIL.

On September 22th, de 2023.