COMANDO DA AERONÁUTICA

CENTRO DE INVESTIGAÇÃO E PREVENÇÃO DE ACIDENTES AERONÁUTICOS

FINAL REPORT
A - 060/CENIPA/2017

OCCURRENCE:	**ACCIDENT**
AIRCRAFT:	**PT-YZM**
MODEL:	**AS 350 B2**
DATE:	**12APR2017**

NOTICE

According to the Law nº 7565, dated 19 December 1986, the Aeronautical Accident Investigation and Prevention System – SIPAER – is responsible for the planning, guidance, coordination and execution of the activities of investigation and prevention of aeronautical accidents.

The elaboration of this Final Report was conducted taking into account the contributing factors and hypotheses raised. The report is, therefore, a technical document which reflects the result obtained by SIPAER regarding the circumstances that contributed or may have contributed to triggering this occurrence.

The document does not focus on quantifying the degree of contribution of the different factors, including the individual, psychosocial or organizational variables that conditioned the human performance and interacted to create a scenario favorable to the accident.

The exclusive objective of this work is to recommend the study and the adoption of provisions of preventative nature, and the decision as to whether they should be applied belongs to the President, Director, Chief or the one corresponding to the highest level in the hierarchy of the organization to which they are being forwarded.

This Report does not resort to any proof production procedure for the determination of civil or criminal liability, and is in accordance with Appendix 2, Annex 13 to the 1944 Chicago Convention, which was incorporated in the Brazilian legal system by virtue of the Decree nº 21713, dated 27 August 1946.

Thus, it is worth highlighting the importance of protecting the persons who provide information regarding an aeronautical accident. The utilization of this report for punitive purposes maculates the principle of "non-self-incrimination" derived from the "right to remain silent" sheltered by the Federal Constitution.

Consequently, the use of this report for any purpose other than that of preventing future accidents, may induce to erroneous interpretations and conclusions.

N.B.: This English version of the report has been written and published by the CENIPA with the intention of making it easier to be read by English speaking people. Taking into account the nuances of a foreign language, no matter how accurate this translation may be, readers are advised that the original Portuguese version is the work of reference.

SYNOPSIS

This is the Final Report of the 12APR2017 accident with the AS 350 B2 aircraft model, registration PT-YZM. The accident was classified as “[CFIT] Controlled Flight into Terrain”.

The helicopter was flying over a beach region in adverse weather conditions and crashed into the sea.

The aircraft was destroyed.

The pilot died at the accident site and the passenger left unharmed.

An Accredited Representative of the *Bureau d'Enquêtes et d'Analyses pour la Sécurité de l'Aviation Civile* (BEA) - France, (State of the primary aircraft type certification) was designated for participation in the investigation.

CONTENTS

GLOSSARY OF TECHNICAL TERMS AND ABBREVIATIONS

AIC	Aeronautical Information Circular
ANAC	Brazil's National Civil Aviation Agency
CA	Airworthiness Certificate
CBA	Aeronautics Brazilian Code
CENIPA	Aeronautical Accident Investigation and Prevention Center
CFIT	Controlled Flight Into Terrain
CG	Center of Gravity
CMA	Aeronautical Medical Certificate
HMNT	Single Turbo Helicopter Rating
IAM	Annual Maintenance Inspection
ICA	Command of Aeronautics' Instruction
IFR	Instrument Flight Rules
IFRH	Instrument Flight Rating - Helicopter
IMC	Instrument Meteorological Conditions
METAR	Aviation Routine Weather Report
PCH	Commercial Pilot License – Helicopter
PLH	Airline Pilot License – Helicopter
PPH	Private Pilot License – Helicopter
RBAC	Brazilian Civil Aviation Regulation
RBHA	Brazilian Aeronautical Certification Regulation
SAE	Aircraft Registration Category of Specialized Air Service
SBGL	ICAO Location Designator - Antônio Carlos Jobim International Airport, Rio de Janeiro - RJ
SBRJ	ICAO Location Designator – Santos Dumont Aerodrome, Rio de Janeiro - RJ
SDRE	ICAO Location Designator – Recreio's Helipad, Rio de Janeiro - RJ
SERIPA III	Third Regional Aeronautical Accident Investigation and Prevention Service
SGSO	Safety Management System
SPECI	Selected Special Aeronautical Weather Report
TMA	Terminal Control Area
TPX	Aircraft Registration Category of Non-Regular Public Air Transport
UTC	Universal Time Coordinated
VFR	Visual Flight Rules
VMC	Visual Meteorological Conditions

1. FACTUAL INFORMATION.

Aircraft	**Model:** AS 350 B2 **Registration:** PT-YZM **Manufacturer:** HELIBRAS	**Operator:** HELIRIO Air Taxi Ltd.
Occurrence	**Date/time:** 12APR2017 - 2125 UTC **Location:** Itacoatiara Beach **Lat.** 22°58'41"S **Long.** 043°02'00"W **Municipality – State:** Niterói – RJ	**Type(s):** "[CFIT] Controlled Flight into Terrain" **Subtype(s):** NIL

1.1 History of the flight.

The aircraft took off from the Recreio's Helipad (SDRE), Rio de Janeiro - RJ, at about 2105 (UTC), in order to carry out a local flight, with a pilot and a passenger on board.

With about twenty minutes of flight, when flying over Itacoatiara beach, located in the city of Niterói - RJ, under adverse weather conditions and in a night flight, the helicopter crashed against the water surface.

The aircraft was destroyed.

The crewmember suffered fatal injuries and the passenger left unharmed.

1.2 Injuries to persons.

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

1.3 Damage to the aircraft.

The aircraft had damage along its entire length, including fuselage, tail cone, skis, engine, main rotor and tail rotor.

1.4 Other damage.

None.

1.5 Personnel information.

1.5.1 Crew's flight experience.

Flight Hours	Pilot
Total	2.515:42
Total in the last 30 days	17:36
Total in the last 24 hours	02:54
In this type of aircraft	2.068:36
In this type in the last 30 days	17:36
In this type in the last 24 hours	02:54

N.B.: The data related to the flown hours were obtained through third parties statements.

1.5.2 Personnel training.

The pilot took the PCH course at EFAI - *Escola de Pilotagem* Ltd., in Contagem – MG, in 2002.

1.5.3 Category of licenses and validity of certificates.

The pilot had the PCH course and had valid HMNT Rating.

The pilot did not have the IFRH Rating.

1.5.4 Qualification and flight experience.

The pilot was qualified and had experience in the kind of flight.

1.5.5 Validity of medical certificate.

The pilot had valid CMA.

1.6 Aircraft information.

The aircraft, serial number 2831, was manufactured by HELIBRAS, in 1996, and it was registered in the TPX/SAE-AC-F/N/P/R category, Aircraft Registration Category of Specialized Air Service – Aerial cinematography, Aerial photography, Aerial inspection, Aerial advertising, Aerial Reporting.

The aircraft had valid Airworthiness Certificate (CA).

The airframe and engine logbooks records were updated.

The last inspection of the aircraft, the “500h/24months type”, was carried out on 03APR2017 by the maintenance organization HELIMAR Helicópteros Ltd., in Rio de Janeiro - RJ, with the aircraft having flown 02 hours and 25 minutes after the inspection.

On the day of the accident, the aircraft logbook recorded a total of 7,056 hours and 35 minutes of flight.

This type of helicopter was certified to operate only under Visual Flight Rules (VFR).

1.7 Meteorological information.

The weather conditions in the city of Rio de Janeiro were not favorable for the visual flight.

The METAR and the SPECI of the Santos Dumont Aerodrome (SBRJ), Rio de Janeiro - RJ, eight nautical miles away from the accident site, contained the following information:

SBRJ 122100Z 22017G28KT 3000 RA BR BK006 BKN030 OVC080 22/20 Q1014=

SPECI SBRJ 122130Z 22011G21KT 4000 -RA BR SCT007 BKN025 OVC080 22/21 Q1015=

SPECI COR SBRJ 122130Z 22011G21KT 4000 -RA BR SCT007 BKN025 OVC080 22/21 Q1015 RERA=

SBRJ 122000Z 23009KT 4500 -RA BR SCT007 BKN025 OVC070 22/21 Q1015 RERA=

The METAR of the Antônio Carlos Jobim International Aerodrome (SBGL), Rio de Janeiro - RJ, fifteen nautical miles away from the accident site, contained the following information:

SBGL 122100Z 23017KT 2000 RA BKN008 BKN020 22/19 Q1015=

SBGL 122200Z 25012KT 4000 RA BKN008 BKN020 21/20 Q1016=

Images of the Itacoatiara seashore, obtained through surveillance cameras positioned on the beach line, which the investigators had access to during the investigation process, showed that the conditions of ceiling and visibility at the crash site were very restrictive.

It was estimated that the prevailing wind in the region had a 220° direction and an intensity of approximately 15kt, with gusts. There was also heavy rain and visibility was restricted to about 4,000 meters.

People who lived near the accident site reported that it was raining very hard at the time of the accident, with intense wind and low visibility.

1.8 Aids to navigation.

Nil.

1.9 Communications.

Nil.

1.10 Aerodrome information.

The occurrence took place out of the Aerodrome.

1.11 Flight recorders.

Neither required nor installed.

1.12 Wreckage and impact information.

The aircraft crashed into the sea surface.

The type of damage identified in the wreckage pointed to a lateral collision of medium intensity, with a low angle and low speed trajectory.

The initial impact, possibly, occurred in a left turn attitude, with approximately 30 degrees of inclination, when the blades of the main rotor collided with the sea surface.

After that first impact, the aircraft spun around its longitudinal axis and the tail cone broke after its rotor touched the water.

With the loss of the tail cone, the helicopter became uncontrollable and the cabin crashed into the water's surface.

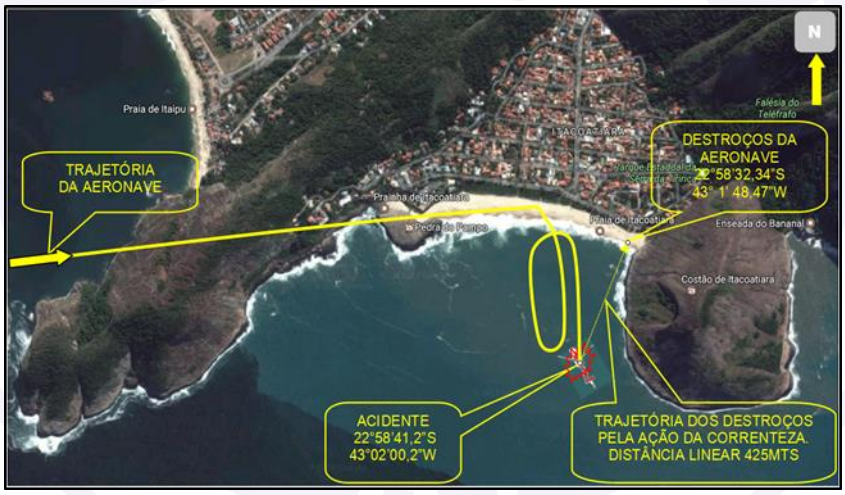

Figure 1 - Sketch of the occurrence.

After identifying the location where the aircraft was, signaling buoys were used to mark its location until it was possible to remove the helicopter from the sea.

However, on 18APR2017, six days after the accident, the aircraft dawned on Itacoatiara beach, having been brought in by the force of the sea current (Figures 2 and 3).

Figure 2 - Aircraft on the beach, after being brought by the sea current.

Figure 3 - General view of the aircraft on the beach, after being removed from the sea.

1.13 Medical and pathological information.

1.13.1 Medical aspects.

According to the autopsy report, the cause of the pilot's death was mechanical asphyxiation in liquid environment (drowning).

1.13.2 Ergonomic information.

Nil.

1.13.3 Psychological aspects.

The pilot and passenger of the aircraft were crewmembers of HELIRIO Air Taxi Ltd. and they had a friendship bond, the passenger being the one who had worked for the company for the longest time.

The purpose of the flight was to “rescue” the passenger's son, also a pilot, who had landed with another helicopter in São José do Imbassaí - RJ, due to adverse weather conditions, and to transfer his aircraft. According to reports, the pilot and passenger of the PT-YZM were not comfortable leaving the young man overnight in that location and decided to go to meet him.

The intention was for the passenger to return piloting the aircraft that had been flown to Imbassaí by his son. According to the information obtained, he (the passenger) was familiar with the route and felt safe in making the flight.

1.14 Fire.

There was no fire.

1.15 Survival aspects.

The passenger evacuated the aircraft and was able to swim to the beach.

The pilot, in turn, was unable to leave the cabin and died from drowning.

1.16 Tests and research.

Due to the damage to the aircraft and the period it was submerged, it was not possible to carry out examinations and tests that could contribute to the investigation.

1.17 Organizational and management information.

The aircraft operator was headquartered in the city of Rio de Janeiro. It performed charter and panoramic flights, in addition to providing aircraft maintenance and hangar services.

According to the data collected, the company did not have pre-defined criteria for flight planning, at the managerial level, which would guide the definition of crew, route, flight level, supply, weather conditions, among other criteria necessary for the flight to take place safely.

According to reports, the flight plans varied according to the profile and criteria of each crewmember who performed them. Crews were formed based on the affinity between the pilots.

There was also no reporting culture to aid the flow of information related to flight safety.

1.18 Operational information.

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

The helicopter took off from the SDRE Helipad, located in Recreio dos Bandeirantes - Rio de Janeiro, to the locality of São José do Imbassaí, located in the Maricá's reef - RJ.

The purpose of the flight was to take the passenger to the place where his son had landed. There, the passenger would take command of the aircraft to make the return to SDRE.

According to reports, no planning for the flight had been carried out and neither the pilot nor the passenger checked the weather conditions prevised on the route. Thus, issues related to bad weather, night flight, secondary routes and landing in an emergency were not discussed.

The flight was being conducted at low altitude over the sea and close to significant elevations. When flying over Itacoatiara Beach, the aircraft entered adverse weather conditions, with rain, gusts of wind and low visibility.

Footage from private security cameras, located at Itacoatiara Beach, allowed us to observe the displacement of the aircraft from the entrance to that cove until the beginning of the turns over the sea.

Apparently, after flying over the beach at a height of less than 500ft, when he saw the elevation known as "Costão de Itacoatiara", the pilot commanded a right turn.

The helicopter traveled for a while on a route parallel to Costão, turned to the right, flew to the beach and turned again to the right, returning to fly parallel to Costão. Near the end of this elevation, there was the collision with the sea surface.

1.19 Additional information.

Regarding the issue of safety in operations, the CBA specified, in its article 169, the following:

"AERONAUTICS BRAZILIAN CODE (1986)

[...]

Chapter III - AIRCRAFT COMMANDER

Article 169 - The commander may, under his responsibility, postpone or suspend the departure of the aircraft, when he deems it essential to flight safety."

In addition, the RBHA n° 91 reinforced this responsibility by stating, in the letter "a" in section 91.3, that the pilot in command of an aircraft was directly responsible for its operation and had the final authority to so much.

"BRAZILIAN AERONAUTICAL APPROVAL REGULATION No. 91

91.3 - PILOT'S RESPONSIBILITY AND AUTHORITY IN COMMAND

(a) The pilot in command of an aircraft is directly responsible for the operation of the aircraft and has the final authority to do so."

At the time of the accident, the ICA 100-12 - Rules of the Air, 2016, established the rules for conducting a VFR flight, highlighting those mentioned below:

"ICA 100-12 - AIR RULES

5.1.2 Notwithstanding the provisions of 5.1.1 above, VFR flights will only be carried out when simultaneously and continuously they can fulfill the following conditions:

a) maintain reference with the ground or water, so that the meteorological formations below the flight level do not obstruct more than half of the pilot's vision area;

[...]

5.1.4 Except for landing and takeoff operations, the VFR flight will not be performed:

a) over cities, towns, inhabited places or groups of people in the open air, at a height of less than 300m (1000 feet) above the highest obstacle within a radius of 600m around the aircraft; and

b) in places not mentioned in the previous paragraph, at a height of less than 150m (500 feet) above the ground or water. "

According to ICA 100-4 - Special Air Traffic Rules and Procedures for Helicopters, 2016, in force at the time of the accident, the following guidelines should be followed for the flight of helicopters under visual flight rules:

"ICA 100-4 - SPECIAL AIR TRAFFIC RULES AND PROCEDURES FOR HELICOPTERS

3.4 CONDITIONS FOR PERFORMING VFR FLIGHT

[...]

3.4.3 NIGHT PERIOD

3.4.3.1 In addition to the conditions prescribed in 3.4.1:

a) the pilot must be qualified for IFR flight;

b) the helicopter must be approved for IFR flight; and

c) the helicopter must have a functioning VHF transceiver to establish bilateral communications with the appropriate ATS agencies.

3.4.3.2 The requirements contained in items "a" and "b" of item 3.4.3.1, when performed entirely in ATZ, CTR or TMA, including the projections of its lateral limits, shall not apply to night VFR flight, including inexistence of these air spaces, when carried out within a radius of 50 km (27 NM) of the aerodrome or helipad of departure."

The AIC n° 16, which dealt with visual circulation at the Rio de Janeiro Terminal, aimed to optimize the use of the Airspace and the Air Traffic Service provided to VFR flight traffic and increase Operational Safety.

This document presented the vertical projection of the limits of the Terminal Control Area Rio de Janeiro (TMA-RJ), including the Control Zones of Rio de Janeiro 1 and 2 (CTR-RJ 1 and CTR-RJ 2), as well as the classification of Airspace types (Figure 4).

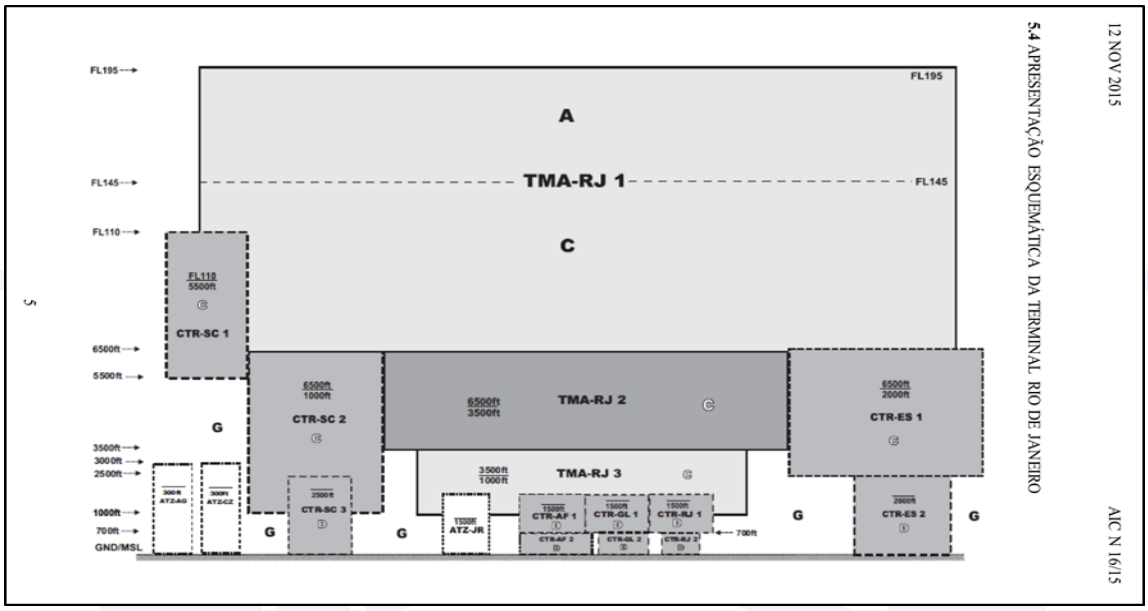

Figure 4 - Schematic presentation of Terminal Rio de Janeiro.

The TMA-RJ 1 had the lower vertical limit of 6,500ft and the upper limit of FL195. The TMA-RJ 2 had a lower vertical limit of 3,500ft and an upper limit of 6,500ft. The TMA-RJ 3, on the other hand, had a lower vertical limit of 1,000ft and an upper limit of 3,500ft.

The CTR-RJ 1 had the lower vertical limit of 700ft and the upper limit of 1,500ft, while the CTR-RJ 2 had the lower vertical limit of GND / MSL and the upper 700ft.

The document also cited that the description of TMA-RJ and all the Air Spaces within its lateral projections, including CTR-RJ 1 and CTR-RJ 2, was contained in AIP BRASIL, part ENR 2.

Considering the data contained in AIP BRASIL, it was possible to define the lateral limits of CTR-RJ 1 and CTR-RJ 2 as shown in Figure 5 below.

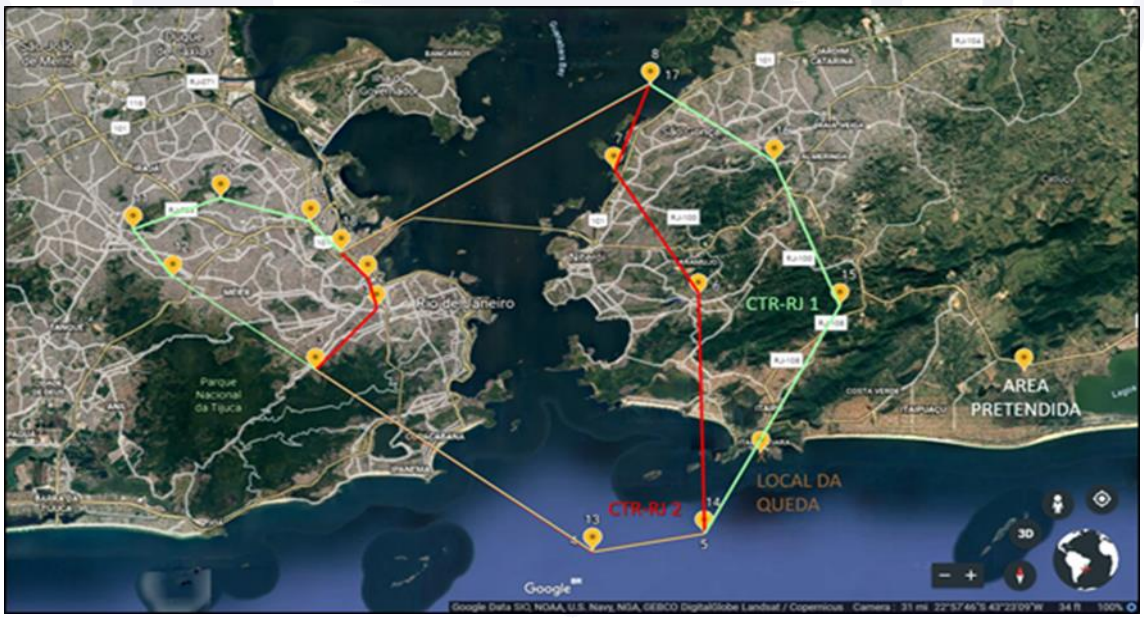

Figure 5 - Illustration of the lateral limits of the CTR-RJ 1 and the CTR-RJ 2.

1.20 Useful or effective investigation techniques.

Nil.

2. ANALYSIS.

It was a non-scheduled flight to carry out an activity of private interest, in which there was a pilot and a passenger on board. The flight time, from takeoff to return to the helipad of origin was estimated at approximately two hours.

The take-off was carried out from the SDRE helipad, with the intention of traveling to the locality of São José do Imbassaí, in the Maricá's reef, where the passenger's son reported that he had landed with another helicopter due to adverse weather conditions.

Thus, the purpose of the flight was to take the passenger to the place where his son had landed so that he (passenger) would take over the controls of the other aircraft and take him back to Recreio dos Bandeirantes.

The reason for this, according to reports, was that the pilot and passenger of the PT-YZM were not comfortable leaving the aircraft and its pilot in the place where he had landed.

According to reports collected during the investigation process, there was no preparatory action for the flight. Thus, issues related to bad weather, night flight, secondary routes and landing in an emergency were not discussed.

This lack of management in relation to the flight, in general, was a reflection of the absence of formal rules related to the responsibilities that involved air activity in the Company, as there were no established criteria for flight planning or for the composition of the crews.

Based on the information collected during the investigation, the weather conditions at the take-off location and on the intended route were unfavorable for the visual flight. It was estimated that the prevailing wind in the region had a direction of 220° and approximately 15kt of speed with gusts, in addition to heavy rain and restricted visibility to about 4,000 meters.

The intended flight included a night leg and aimed at landing in an area outside the lateral limits of the CTR-RJ 1 and 2 (Figure 5).

Therefore, the requirements established in item 3.4.3 of the ICA 100-4 were not being met, since its performance, under those conditions, required a pilot with IFRH Rating and an aircraft approved for IFR flight.

In addition, the flight at a height of less than 500ft over the sea characterized the breach of item 5.1.4 of ICA 100-12.

Thus, the impossibility of flying under IFR flight rules and the persistence of continuing to the planned destination flying at low altitude under adverse weather conditions characterized these violations as contributing factors to this accident.

It is known that both non-compliance with formal guidelines and the adoption of informal rules in the development of complex activities, such as those related to the flight, can add threats, risks and dangers to the operating contexts.

Thus, the performance of the flight in which this accident occurred, without proper planning, under adverse weather conditions at night, without the pilot being adequately qualified and without the helicopter being properly certified to perform flights under IFR rules, characterized an attitude of complacency in relation to the responsibilities assigned to the aircraft commander in Article 169 of the CBA and in section 91.3 of the RBHA n° 91 with regard to flight safety, which contributed to this occurrence.

In addition, there was an inadequate assessment of the real need to fly under those unsafe operating conditions, as well as the decision to proceed to the intended destination even in the face of deteriorating weather conditions, facts that also contributed to this accident.

Considering the personal involvement linked to the purpose of the flight, it is possible that such decisions were influenced by a high motivation for its realization, considering that the intention to carry it out was the “rescue” of the passenger's son, with whom the pilot had a bond of friendship.

In this scenario, inappropriate judgments about the factors involved in the intended operation compromised the quality of the commander's decision-making process and resulted in inappropriate choices that contributed to the accident, the object of this investigation.

The finding that the quality of flight plans depended on the profile and personal criteria of each crewmember, as well as the information that the crews were trained based on the affinity between pilots, indicated the company's inefficiency in managing people and processes, which resulted in the lack of monitoring and supervision of the activities of its employees and in the absence of an adequate outline of organizational procedures important to the maintenance of operational safety.

These deficiencies resulted in the decision to start and conduct a flight without careful planning, under adverse weather conditions, with an inadequate crew and aircraft, and for reasons predominantly personal to those involved, circumstances that favored the occurrence of the accident that is the object of this investigation.

In turn, this lack of monitoring and supervision of planning and execution activities at the operational level reflected inadequate supervision by the organization's management, which also contributed to the flight being carried out without adequate safety conditions.

Thus, the way air activity was conducted in the company and the way in which the flight of this accident occurred, was prepared and performed, demonstrated a low adherence to the principles of flight safety, characterized by the application of informal rules, informally institutionalized, and pointed out the fragility of the organizational culture regarding flight safety.

The METAR and SPECI of SBRJ, eight nautical miles away from the crash site, showed that the weather conditions in the region where the aircraft was evolving were not favorable for the visual flight.

Images from the Itacoatiara seashore showed that the ceiling and visibility conditions at the crash site were very restrictive and it was already dark at the time of the accident.

In this scenario, it is likely that the pilot found it difficult to continue flying with visual references and, as he was not qualified in IFR flight, it is possible that conducting the flight under such conditions resulted in a spatial disorientation during the turns made over the sea.

In such conditions, it is also relatively common for a pilot to fly his aircraft in a controlled flight to the ground collision without realizing it.

In the case of this occurrence, the damage observed in the wreckage indicated a side impact, in a left turn attitude with approximately 30 degrees of inclination and a low angle and low speed trajectory, thus corroborating to the Controlled Flight Into Terrain hypothesis.

There were no records of radio messages from PT-YZM in which any reference was made to the abnormal functioning of its systems or to the existence of any emergency condition with the aircraft or its commander.

Likewise, according to the report of the surviving passenger, who was also a pilot, there was no abnormality in the flight until the collision with the sea.

Thus, the possibility that a mechanical failure or issues related to the pilot’s lack of Rating were ruled out as contributing factors to the accident.

3. CONCLUSIONS.

3.1 Facts.

a) the pilot had valid CMA;

b) the pilot had the PCH License and had valid HMNT;

c) the pilot did not have the IFRH Rating;

d) the aircraft had valid CA;

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

f) the airframe and engine logbooks records were updated;

g) the weather conditions were not favorable for the visual flight;

h) the aircraft was not certified to operate under IFR flight rules;

i) the aircraft took off from SDRE, to the São José do Imbassaí, with a pilot and a passenger on board;

j) when flying over the Itacoatiara Beach, the pilot encountered adverse weather conditions, with rain, gusts of wind and low visibility;

k) the flight was being conducted at low altitude, over the sea and close to elevations;

l) there were no records of messages from PT-YZM in which any reference was made to an abnormal systems operation or to the existence of any emergency condition with the aircraft or its commander;

m) the surviving passenger, who was also a pilot, reported that there was no abnormality in the flight until the collision with the sea;

n) the aircraft collided with the sea surface;

o) the aircraft was destroyed;

p) the passenger left unharmed; and

q) the pilot suffered fatal injuries.

3.2 Contributing factors.

- **Attitude – a contributor.**

The performance of the flight in which this accident occurred, without proper planning, under adverse weather conditions at night, without the pilot being properly qualified and without the helicopter being properly certified to perform flights under IFR rules, characterized an attitude of complacency in relation to the responsibilities assigned to the aircraft commander in Article 169 of the CBA and in section 91.3 of the RBHA n° 91 with regard to flight safety, which contributed to this occurrence.

- **Adverse meteorological conditions – undetermined.**

It is possible that the conduct of the flight under adverse weather conditions, by a pilot not qualified to operate IFR, in an aircraft not certified for this type of operation, contributed to a spatial disorientation and resulted in a CFIT.

- **Organizational culture – a contributor.**

The way the air activity was conducted in the Company and the way in which the flight of this accident occurred was prepared and carried out, demonstrated a low adherence to the principles of flight safety, characterized by the application of informal rules, informally institutionalized, and pointed out the fragility of organizational culture with regard to flight safety.

- **Disorientation – undetermined.**

It is likely that the pilot (not qualified in IFR flight) was disoriented during the turns made in the Itacoatiara region while trying to maintain himself in visual flight conditions over the sea, at night and in an adverse weather conditions.

In this scenario, it is possible that he inadvertently placed the aircraft on a controlled descending flight path, without realizing the imminence of the impact against the sea.

- **Flight indiscipline – a contributor.**

The impossibility of flying under IFR flight rules and the persistence of continuing to the planned destination flying at low altitude in adverse weather conditions characterized the violations of items 3.4.3 of the ICA 100-4 and 5.1.4 of the ICA 100-12 as contributing factors to this accident.

- **Piloting judgment – a contributor.**

There was an inadequate assessment of the real need to fly under those unsafe operating conditions, as well as the decision to proceed to the intended destination even in the face of deteriorating weather conditions, facts that also contributed to this occurrence.

- **Motivation – undetermined.**

Considering the personal involvement linked to the purpose of the flight, it is possible that the decisions to make it under those unsafe operational conditions and to proceed to the intended destination even in the face of deteriorating weather conditions have been influenced by a high motivation, considering that his intention was to “rescue” the passenger's son, with whom the pilot had a friendship bond.

- **Flight planning – a contributor.**

Considering the reports that there was no preparatory action for the flight and that, in this context, issues related to bad weather, night flight, secondary routes and an emergency landing were not discussed, it was concluded that the preparation work carried out by the pilot for the flight was not adequate, characterizing the planning as a contributing factor for this occurrence.

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

The context in which the accident occurred demonstrated that inadequate judgments about the factors involved in the intended operation compromised the quality of the commander's decision-making process and resulted in inappropriate choices that contributed to the occurrence, object of this investigation.

- **Organizational processes – a contributor.**

The Company's inefficiency in the management of people and processes, characterized by the lack of monitoring and supervision of the activities of its employees and the absence of an adequate outline of organizational procedures important to the maintenance of operational safety, resulted in the decision to start and conduct a flight without careful planning, under adverse weather conditions, with inadequate crew and aircraft and for reasons predominantly personal to those involved, circumstances that favored the occurrence of this accident, object of this investigation.

- **Managerial oversight – a contributor.**

The lack of monitoring and supervision of planning and execution of activities, at the operational level, reflected inadequate supervision by the organization's management, which also contributed to the flight being carried out without adequate safety conditions.

4. SAFETY RECOMMENDATION.

A proposal of an accident investigation authority based on information derived from an investigation, made with the intention of preventing accidents or incidents and which in no case has the purpose of creating a presumption of blame or liability for an accident or incident. In addition to safety recommendations arising from accident and incident investigations, safety recommendations may result from diverse sources, including safety studies.

In consonance with the Law n°7565/1986, recommendations are made solely for the benefit of the air activity operational safety, and shall be treated as established in the NSCA 3-13 "Protocols for the Investigation of Civil Aviation Aeronautical Occurrences conducted by the Brazilian State".

Recommendations issued at the publication of this report:

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

A-060/CENIPA/2017 - 01 **Issued on 03/29/2021**

Work with HELIRIO Air Taxi Ltd., so that the operator can improve the SGSO adopted by the Company, especially with regard to flight planning mechanisms, managerial supervision of operations and organization of work implemented.

A-060/CENIPA/2017 - 02 **Issued on 03/29/2021**

Disseminate the lessons learned in the present investigation, in order to alert pilots and operators who work in the coastal region of São Paulo and Rio de Janeiro states about the importance of meeting the minimum operating requirements and the rules of visual flight.

5. CORRECTIVE OR PREVENTATIVE ACTION ALREADY TAKEN.

None.

On March 29th, 2021.