

COMANDO DA AERONÁUTICA
CENTRO DE INVESTIGAÇÃO E PREVENÇÃO DE
ACIDENTES AERONÁUTICOS



FINAL REPORT
A-193/CENIPA/2013

OCCURRENCE:	ACCIDENT
AIRCRAFT:	PT-HZQ
MODEL:	AS 350 B2
DATE:	27OCT2013



NOTICE

According to the Law n° 7565, dated 19 December 1986, the Aeronautical Accident Investigation and Prevention System – SIPAER – is responsible for the planning, guidance, coordination and execution of the activities of investigation and prevention of aeronautical accidents.

The elaboration of this Final Report was conducted 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 n° 21713, dated 27 August 1946.

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

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

N.B.: This English version of the report has been written and published by the CENIPA with the intention of making it easier to be read by English speaking people. 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 27OCT2013 accident with the AS 350 B2 aircraft, registration PT-HZQ. It was classified as “Loss of Control in Flight”.

During a local training flight at the Ilhéus Aerodrome - BA, there was loss of control of the aircraft in flight, which collided with the ground.

The aircraft had substantial damage.

The pilot and two passengers left unharmed.

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



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GLOSSARY OF TECHNICAL TERMS AND ABBREVIATIONS

ANAC	National Civil Aviation Agency
APP	Approach Control
ATS	Air Traffic Services
BEA	Bureau d'Enquêtes et d'Analyses pour la Sécurité de l'Aviation Civile
CA	Airworthiness Certificate
CENIPA	Aeronautical Accident Investigation and Prevention Center
CG	Center of Gravity
CHT	Technical Qualification Certificate
CIV	Pilot's Flight Logbook
CM	Registration Certificate
CMA	Aeronautical Medical Certificate
GSO	Operational Safety Manager
IAM	Annual Maintenance Inspection
IFR	Instrument Flight Rules
INFRAERO	Brazilian Airport Infrastructure Company
INVH	Flight Instructor License - Helicopter
METAR	Meteorological Aerodrome Report
NTSB	National Transportation Safety Board
PCH	Commercial Pilot License - Helicopter
PPH	Private Pilot License - Helicopter
RBHA	Brazilian Regulation of Aeronautical Homologation
RELPREV	Prevention Report
RS	Safety Recommendation
SAE-AL	Aircraft Registration Category of Specialized Air Service - Air Survey
SBIL	ICAO location designator – Ilhéus Aerodrome - BA
SERIPA	Regional Aeronautical Accidents Investigation and Prevention Service
SIPAER	Aeronautical Accidents Investigation and Prevention System
SGSO	Operational Safety Management System
UTC	Universal Time Coordinated
VFR	Visual Flight Rules

1. FACTUAL INFORMATION.

Aircraft	Model: AS 350 B2 Registration: PT-HZQ Manufacturer: HELIBRAS	Operator: Specialized Industrial Air Service SAI Ltd.
Occurrence	Date/time: 27OCT2013 - 1946 UTC Location: Ilhéus Aerodrome - BA Lat. 14°48'54"S Long. 039°02'00"W Municipality – State: Ilhéus - BA	Type(s): “Loss of Control In Flight” Subtype(s): Nil.

1.1 History of the flight.

The aircraft took off from the Ilhéus Aerodrome (SBIL) at 1934 (UTC) to conduct a local training flight with one pilot and two passengers on board.

With about 12 minutes of flight, there was loss of control of the aircraft in flight, which crashed against the ground. The helicopter toppled over by the right side in the 1000ft mark on threshold 29.

The aircraft suffered substantial damage.

The pilot and the two passengers left unharmed.

1.2 Injuries to persons.

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

1.3 Damage to the aircraft.

The aircraft had substantial damage throughout the main rotor assembly, gearbox, horizontal stabilizer, right-side ski and fuselage.

1.4 Other damage.

Nil.

1.5 Personnel information.

1.5.1 Crew's flight experience.

Hours Flown	
	Pilot
Total	5.000:00
Total in the last 30 days	75:00
Total in the last 24 hours	07:00
In this type of aircraft	4.000:00
In this type in the last 30 days	75:00
In this type in the last 24 hours	07:00

N.B.: The Data on flown hours were obtained from the pilot.

1.5.2 Personnel training.

The pilot took the Private Pilot Course - Helicopter (PPH) at Brazil Aeroclube - RJ, in 1997.

1.5.3 Category of licenses and validity of certificates.

The pilot had the Commercial Pilot License – Helicopter (PCH) and had valid Technical Qualification for the H350 aircraft and Flight Instructor License.

1.5.4 Qualification and flight experience.

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

1.5.5 Validity of medical certificate.

The pilot had valid Aeronautical Medical Certificates (CMA).

1.6 Aircraft information.

The aircraft, serial number AS 2871, was manufactured by HELIBRAS, in 1996 and was registered in the SAE-AL category.

The aircraft had valid Certificate of Airworthiness (CA).

The airframe and engine logbook records were updated.

The aircraft had performed the "08H, 15H, 07D, 30H, 50H, 100H, 100H, 150H, 200H, 300H and 300 / 12M" inspections on 08OCT2013 at *Helialfa Comércio e Serviços Ltd.*, in Barueri - SP, having flown 82 hours and 20 min after the inspection.

1.7 Meteorological information.

Meteorological conditions were favorable for the visual flight.

The meteorological bulletins of locality (METAR) from the Ilhéus Aerodrome (SBIL) had the following information:

METAR SBIL 271900Z 07009KT 9999 SCT030 26/20 Q1011=; e

METAR SBIL 272000Z 07006KT 9999 FEW030 26/19 Q1011=.

1.8 Aids to navigation.

Nil.

1.9 Communications.

Nil.

1.10 Aerodrome information.

The Aerodrome was public, operated by the Brazilian Airport Infrastructure Company (INFRAERO), and operated under visual rules (VFR) and instrument flight (IFR), during daytime and nighttime periods.

The runway was made of asphalt, with thresholds 11/29, dimensions of 1,577m x 45m, with elevation of 13ft.

At the time of the occurrence, the runway was unobstructed and dry.

1.11 Flight recorders.

Neither required nor installed.

1.12 Wreckage and impact information.

After one of the successive takeoffs from the grass area, located on the side of the runway, near threshold 29, the aircraft started a series of uncontrolled turns counterclockwise, moving in the direction of threshold 11.

Upon completion of the fifth turn on the landing / take-off runway, the aircraft entered a downward trajectory to the right until the touch of the main rotor blades on the asphalt, followed by the flipping over to the right side (Figure 1).



Figure 1 - Moment of the aircraft's impact.

The helicopter toppled over the 1000ft mark on the head of runway 29 (Figure 2).



Figure 2 - Aircraft wreckage.

1.13 Medical and pathological information.

1.13.1 Medical aspects.

There was no evidence that physiological or incapacitation weights affected the performance of the crewmember.

1.13.2 Ergonomic information.

Nil.

1.13.3 Psychological aspects.

The Commander, who was also a flight instructor, was at the helicopter company for two and a half years.

According to the aircraft logbook, there was another pilot on board, with PPH license, which was at the beginning of his career.

Although he did not acknowledge that the accident occurred during an instruction flight, the aircraft Commander considered it appropriate for experienced pilots to teach flight instruction in similar circumstances, that is, to use other types of flight, in order to help pilots early in their careers.

He reported that, in the scope of his working group, non-formal air training was a common practice and that in many cases it occurred without the monitoring or acquiescence of the aircraft operator, with only the establishment of tacit agreements between the pilots involved.

As for the events that resulted in the accident, he believed that the aircraft was with problems, since, on returning from the previous flight, he observed that the flight commands were hardened.

Thus, when he realized that he had lost control in flight, he decided to allow the helicopter to crash into the ground in an attempt to avoid consequences that would be more serious.

The pilot acknowledged that he did not always test the aircraft's hydraulic system before taking off, such as on this flight, and because of his flight experience he felt safe operating the helicopter without the operation of that system.

1.14 Fire.

There was no fire.

1.15 Survival aspects.

The evacuation of the three occupants of the aircraft had the help of firefighters and occurred successfully.

1.16 Tests and research.

The aircraft's hydraulic system was analyzed by an HELIBRAS/Airbus Helicopters engineer, the Technical Advisor appointed by the Bureau d'Enquêtes et d'Analyses (BEA) and the representative of the SIPAER, at the premises of the Heliport Ecological Center shop, in Barueri - SP, resulting in the technical report, which includes:

“Conclusion - The check of the complete hydraulic system of this aircraft after the accident confirms that the hydraulic system operates correctly and as expected. No anomaly or malfunctioning, which should explain the loss of the control reported before the accident, has been observed. The right hand main servo control has not been tested during this sequence due to its extensive damage resulting from the accident (no pre-accident damage has observed on this servo control).”

Thus, it was confirmed that the aircraft's hydraulic system operated correctly as expected, not showing any anomaly or malfunction.

1.17 Organizational and management information.

The operator started his activities in 2003, being classified in Category "A", as Company of Air survey with the Ministry of Defense.

From the organizational model of the operating company, it was possible to infer that great importance was attached to the productivity and profitability aspects. However, it was unclear whether there was similarity in the treatment of issues related to aircraft operation and flight safety itself.

The Commander involved in the accident had the absolute confidence of his employer, given his professional experience. He was the most experienced pilot in the company and, as operations manager; he had autonomy to make decisions that involved the operation of the helicopters, including the invitation to the crew that acted as co-pilots, freelancers, in the operations of air survey.

There was no effective operational oversight of the company, as all flight-related activities were under the responsibility of the Commander.

The owner of the company had little knowledge about aviation activities and did not consider the possibility of his aircraft being used on instruction flights without his knowledge, as well as the consequences of this situation.

1.18 Operational information.

In the days before the accident, the aircraft carried out a ground survey flight in the Northeast.

On the day of the accident, the Aircraft took off from Natal Airport to the city of Ilhéus, and made stops at the Airports of Maceió and Aracaju.

At Ilhéus airport, the aircraft was refueled for an air survey flight, near the city of Itabuna - BA, lasting 40 minutes.

After landing at SBIL, a new refueling was performed, aiming at a flight in the inner area of that airport site, precisely on the grassy area in the runway near threshold 29.

According to the transcript of communications with the ATCs at 19:34:25 pm (UTC), the pilot of the aircraft reported that he was "passing threshold 29 for solo training".

At 19:34:54 (UTC) the pilot of the aircraft informed that he would "do the training of the ground in the parallel of threshold 29". The records showed that the penultimate contact between the pilot and Ilhéus Approach Control (APP-IL) was at 19:35:22 (UTC).

From that moment, the aircraft performed a sequence of hovered flights, followed by landing maneuvers and landing on the grassy area (runway strip) located near threshold 29 (Figures 3 and 4).



Figure 3 - View of the aircraft in the grassy area.



Figure 4 - View of aircraft performing approach maneuver.

At 19h45min02sec (UTC), there was the last communication between the pilot of the aircraft and the APP-IL, followed by the accident (Figure 5).



Figure 5 - View of the aircraft after the accident.

As stated in the Flight Manual of the aircraft, starting section, the test of the hydraulic system must be performed before each takeoff, more precisely after starting the engine. The aircraft's hydraulic system test consists of the Hydraulic Accumulator Test and the Hydraulic Isolation Test.

In the event of a hydraulic system failure identified by the HYD red light on the alarm panel, the aircraft's Flight Manual states that the pilot shall reduce the speed to 60 kt, turn off the hydraulic system key and perform a low ramp approach followed by a running landing.

The pilot acknowledged that he did not always test the aircraft's hydraulic system prior to take-offs and that, because of his flight experience, he felt safe operating the helicopter without the hydraulic control if there was a failure of this system.

In the flight in which the accident happened, the takeoff was performed without that system being tested.

For training simulating the failure of the hydraulic system, Supplement 7 of the Aircraft Flight Manual states that:

2 - TRAINING PROCEDURES

The training procedures consist of two phases:

- Transition to recommended safety speed from steady flight conditions.
- Transition to landing.

CAUTION: DO NOT ATTEMPT TO CARRIER TO HOVER FLIGHT OR ANY LOW SPEED MANEUVER WITHOUT HYDRAULIC PRESSURE ASSISTENCE. THE INTENSITY AND DIRECTION OF THE CONTROL FEED BACK FORCES WILL CHANGE RAPIDLY. THIS WILL RESULT IN EXCESSIVE PILOT WORKLOAD, POOR CONTROL AIRCRAFT, AND POSSIBLE LOSS OF CONTROL.

Therefore, it is made clear that, in training flights simulating hydraulic system failures, no hovering or maneuvering at low speed should be performed without the aid of hydraulic pressure.

According to the information contained in the logbook of the aircraft, on flights between 16 and 27OCT2013, the helicopter crew consisted of the Commander and a pilot that had a Private Pilot - Helicopter (PPH) license.

Through the records of the National Civil Aviation Agency (ANAC), it was verified that the private pilot was qualified in the operation of helicopters of the type R-22, and did not have until the date of the accident, qualification in type aircraft H350.

Such pilot was not part of the staff of the aircraft's operating company, having participated in the flights of air survey in order to gain experience in the operation in that type of aircraft.

There was no certificate to prove the completion of a theoretical course of aircraft type AS 350 B2, in a school / institution homologated by ANAC, by the private pilot.

An engineer who was on board the aircraft at the time of the accident attended the air survey flights.

The helicopter was within the limits of weight and center of gravity (CG) specified by the manufacturer.

1.19 Additional information.

The commander reported that upon returning from the flight near the city of Itabuna, he noticed that the aircraft's flight commands were hardened and that, for this reason, he decided to carry out a verification flight. However, communication between the pilot and the APP-IL indicates that the pilot would be conducting a solo training flight.

Before the accident, the aircraft was spotted performing a sequence of hovered flights, followed by approach and landing maneuvers. A loss of control in flight occurred during a hovering flight at low altitude.

During the first action, it was observed that the cut-off switch of the aircraft's hydraulic system was OFF (Figure 6).

However, due to the actions arising from the removal of the aircraft, such information could not be adequately considered since third parties may have handled this key.



Figure 6 - Hydraulic system cut off switch in OFF.

Pilots of this helicopter model, when interviewed, were unanimous in stating that it is possible to maintain control of the aircraft without the assistance of the hydraulic system, regardless of the flight phase.

Regarding the prerogatives of private pilot license holders, the Brazilian Regulation of Aeronautical Homologation 61 (RBHA 61) provided that:

61.85 Prerogatives of the holder of the private pilot license and conditions that must be observed to carry them out

(a) The prerogatives of the holder of a private pilot license shall be limited to acting as pilot-in-command or second-in-command of an aircraft of the appropriate category to his or her license and performing unpaid and unapproachable commercial flights.

61.217 Prerogatives and limitations of the type-rating holder

(a) Subject to compliance with the provisions set forth in these Regulations, the prerogatives of the type-rating holder shall be to pilot aircraft corresponding to the type in which he has qualified as a pilot-in-command or second-in-command. Depending on the level of requirements observed and respecting the possible limitations indicated in its authorization, as established in paragraph 61.5 (c) of this Regulation.

The aircraft operator had not implemented an Operational Safety Management System (OSMS) within the scope of the company, as established by Resolution no. 106 of ANAC, of 30JUN2009.

1.20 Useful or effective investigation techniques.

Nil.

2. ANALYSIS.

The aircraft took off from the general aviation patio of the Ilhéus Aerodrome, to conduct a flight in the inner area of that airport site, with the Commander, an unlicensed helicopter pilot on that model and an engineer on board.

The aircraft Commander informed APP-IL that he would perform a solo training flight on the left side of SBIL's threshold 29.

Approximately twelve minutes after takeoff, there was the loss of control of the aircraft in flight, which came crashing into the asphalt of the runway.

In that twelve-minute interval, the aircraft was spotted performing a sequence of hovered flights, approach maneuvers and landing on the left side of threshold 29.

The loss of control occurred when the aircraft was hovering a few meters above the ground.

The hydraulic system test was not performed before takeoff, although it was an item in the aircraft checklist.

Although it was not possible to perform the right hand main servo control test due to severe damage, the analyzes performed confirmed that the hydraulic system was functioning properly, and that no anomaly or malfunction was observed that would explain the loss of control in flight of the aircraft, as reported by the helicopter Commander.

Also considering that in the first action, the hydraulic switch was observed in the OFF position, the following hypotheses were raised:

- the flight on the side of threshold 29 Ilhéus Aerodrome had the character of instruction, even the Commander of the aircraft having reported by voice transmission that it was a solo training flight;

- at a given moment, during a hovering flight at low altitude, the helicopter's hydraulic system was switched off;

- the removal of the hydraulic system caused rapid changes in the intensity and direction of the forces exerted to maintain control of the aircraft, causing an overload of work of Commander; and

- realizing that the point of reversibility of the accident had been overcome by the impossibility of reestablishing control of the flight, since there was not enough time for the

definition of a speed that would allow the stabilized flight of the helicopter, the Commander decided to precipitate the shock of the aircraft against the ground.

The performance of hovering or any low speed maneuver without the assistance of the aircraft's hydraulic system contravenes the guidance set out in Supplement 7 of the Aircraft Flight Manual.

In spite of the hydraulics being acting or not, the actions of the Commander were not effective in maintaining the control of the aircraft, characterizing an inadequacy in the use of the commands of flight.

The information contained in the logbook indicated that there was the participation of a private pilot (PPH) composing the crew of the aircraft, during the realization of flights of air survey, between the days 16 and 27OCT2013.

This fact points to the noncompliance of RBAC 61.85, since it characterizes the pilot action without a compatible license to perform air activity of a commercial nature.

Similarly, the members of the crew per pilot without proper Technical Qualification in that type of aircraft (AS 350 B2), including the flight in which the accident occurred, refers to non-compliance with RBAC 61.217.

These facts have shown an attitude of not considering the current regulations, which may have resulted from the high level of confidence that the pilot has developed throughout his flight experience.

As there was no systematic monitoring of the crew's professional performance by the operator, and the pilot of this occurrence had complete autonomy and responsibility to manage the operation of the aircraft, there was no control of the activities performed with the equipment, by the company, such as instruction.

It is possible that in the event of an instructional flight, the loss of flight control was related to improper handling of the duties on board or failure to communicate between the aircraft Commander and the other pilot on board.

In addition, as reported by the pilot, in the course of his working group, non-formal air training was a common practice, and in many cases, it occurred without monitoring or acquiescence of the aircraft operator, only having the establishment of agreements between the pilots involved.

Therefore, this workgroup culture was based on informal attitudes and practices that went against flight safety. It reflects the mentality that prevailed in this circle of professionals, who exposed the operation to risk.

The lack of the implementation of a SGSO within the company, made it difficult to identify the aspects raised in the present investigation, inhibiting the timely adoption of the mitigating measures by the aircraft operator.

3. CONCLUSIONS.

3.1 Facts.

- a) the pilot had valid Aeronautical Medical Certificate (CMA);
- b) the pilot had valid Technical Qualification for H350 aircraft;
- c) the pilot was qualified and had experience in that kind of flight;
- d) the aircraft had valid Airworthiness Certificate (CA);
- e) the aircraft was within the weight and balance parameters specified by the manufacturer;
- f) the airframe and engine logbook records were updated;

- g) at the time of the accident, the Commander of the aircraft, a pilot (PPH), who was not technically qualified to operate an aircraft of model AS 350 B2 and an engineer, were on board;
- h) the PPH was not part of the staff of the company operating the aircraft;
- i) the PPH did not present a certificate proving the completion of theoretical course of aircraft model AS 350 B2;
- j) the Commander informed APP-IL that he would perform solo training near threshold 29 of the runway;
- k) The aircraft was sighted performing a sequence of hovered flights and approach and landing maneuvers on the runway strip (grassy area), located in the vicinity of the SBILthreshold 29;
- l) in the first action, the hydraulic system cut-off switch was found in the OFF position;
- m) the analyzes performed confirmed that the hydraulic system was functioning properly and that no anomaly or malfunction was observed that would explain the loss of control in flight of the aircraft, prior to the accident;
- n) the aircraft had substantial damage; and
- o) the occupants of the aircraft were unharmed.

3.2 Contributing factors.

- Handling of aircraft flight controls – a contributor.

In spite of the flight experience, the Commander was not able to reverse the turning tendency of the aircraft, through the application of the commands, in the moments that preceded the accident.

- Attitude – undetermined.

The pilot's high confidence in operational capacity could have helped to ensure that adequate compliance with the envisaged rules and procedures was not properly achieved.

- Cabin Coordination - undetermined.

It is possible that the conduct of an informal flight instruction has led to the inefficiency in the use of the human resources available for the operation of the aircraft, due to the inadequate management of the tasks assigned to each crewmember.

- Work-group Culture – undetermined.

If the pilot has actually carried out informal instruction, it is possible that this attitude was a reflection of the culture of the work group to which the pilot participated and that he considered this practice as a common thing, disregarding the risks involved to flight safety.

- Flight indiscipline – undetermined.

The performance of hovering and low-speed maneuvers, possibly without the assistance of the aircraft's hydraulic system, contravened guidance contained in the aircraft's Flight Manual.

The possible formation of the crew per pilot without the appropriate Technical Qualification on that type of aircraft (AS-350 B2), on the flight in which the accident happened, refers to the non-compliance of item 61.217 of the RBHA 61.

- **Piloting judgement – undetermined.**

It is possible that the eventual shutdown of the hydraulic system in the observed circumstances was associated with the inadequate assessment of the basic aspects of the aircraft's operation by its Commander.

- **Work organization – a contributor.**

The management model of the operating company of the aircraft, in which responsibility and autonomy of operation issues were entirely borne by the pilot, allowed the adoption of risky and informal practices that affected the safety of the operation

- **Flight planning – undetermined.**

The performance of a training flight requires adequate preparation that includes the prior planning of all the maneuvers to be performed, as well as the knowledge of technical and operational aspects for the execution of the proposed exercises.

Therefore, the possible use of procedures not envisaged in the Flight Manual, during low-flying flights, landing approach maneuvers, and instruction flight without prior preparation, may have contributed to this occurrence.

- **Decision-making process – undetermined.**

The decision to shut down the hydraulic system may have been the result of an inaccurate analysis of the factors and conditions that could affect the flight, including the adoption of unforeseen procedures.

- **Organizational processes – a contributor.**

The lack of a formal systematic monitoring of the commander's performance facilitated the use of non-recommended practices in the operation of the aircraft, for example, failure to perform the check of the hydraulic system before each flight and the accomplishment of instruction flight without the knowledge of the aircraft's operating company's management.

- **Managerial oversight – a contributor.**

Failure to establish adequate monitoring by the aircraft operator, the planning and execution phases of the air survey prevented the timely identification of the failures that resulted in the accident.

4. SAFETY RECOMMENDATION.

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

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

Recommendations issued at the publication of this report:

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

A-193/CENIPA/2013 - 01

Issued on 25/06/2018

Ensure the adequacy of the Management Supervision mechanisms adopted by the aircraft operator, aiming to better define the responsibility and autonomy of its operations management, in order to avoid the use of non-recommended practices, such as the formation of the helicopter crews by pilots without qualification.

A-193/CENIPA/2013 - 02

Issued on 25/06/2018

Ensure the adoption of Management Supervision mechanisms by the aircraft operator, seeking to allow the performance of the instruction flights in their aircraft to occur only when the established standards are met and in a timely manner known by their managers.

A-193/CENIPA/2013 - 03

Issued on 25/06/2018

Ensure the adequacy of the Management Supervision mechanisms adopted by the aircraft operator, aiming at the standardization of the operation of its helicopters model AS 350 B2, in particular, in the performance of the hydraulic system test before each takeoff, in accordance with the checklist and in the Aircraft Flight Manual.

A-193/CENIPA/2013 - 04

Issued on 25/06/2018

Ensure the implementation of a SGSO by the aircraft operator, in accordance with ANAC Resolution 106, 30JUN2009.

5. CORRECTIVE OR PREVENTATIVE ACTION ALREADY TAKEN.

Nil.

On June 25th, 2018.