COMANDO DA AERONÁUTICA

CENTRO DE INVESTIGAÇÃO E PREVENÇÃO DE ACIDENTES AERONÁUTICOS

FINAL REPORT
IG - 040/CENIPA/2021

OCCURRENCE:	**SERIOUS INCIDENT**
AIRCRAFT:	**PP-UGS**
MODEL:	**A109S**
DATE:	**13MAR2021**

NOTICE

According to 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 investigation and prevention activities of aeronautical accidents.

The elaboration of this Final Report was conducted by taking into account the contributing factors and hypotheses raised. Therefore, the report is a technical document reflecting 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 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 into the Brazilian legal system by 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, using this report for any purpose other than preventing future accidents may induce 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 13MAR2021 serious incident with the A109S aircraft model, registration PP-UGS. The serious incident was classified as “[CTOL] Collision with an obstacle during take-off and landing”.

After the take-off from SIIX, the flight intended to make a landing at an intermediate, unregistered location, for boarding an elderly passenger, with mobility restrictions, to transport him to São Paulo - SP.

The investigation found a failure in the flight planning, risk management, and piloting judgment during the landing, culminating in the tail rotor blades touching an approximately 5 m high lamp post.

The aircraft had light damage.

The pilot left unharmed.

An Accredited Representative of the *Agenzia Nazionale per la Sicurezza del Volo* (ANSV) - Italy, (State where the aircraft was manufactured/designed) was designated for participation in the investigation.

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GLOSSARY OF TECHNICAL TERMS AND ABBREVIATIONS

ANAC	Brazil's National Civil Aviation Agency
ANSV	*Agenzia Nazionale per la Sicurezza del Volo*
BKN	Broken (5-7 oktas)
CA	Airworthiness Certificate
CENIPA	Aeronautical Accident Investigation and Prevention Center
CMA	Aeronautical Medical Certificate
FEW	Few (1 and 2 oktas)
HMLT	Multi-Engine Turbine Rating - Helicopter
IFRH	Instrument Flight Rating - Helicopter
IMC	Instrument Meteorological Conditions
METAR	Meteorological Aerodrome Report
OM	Maintenance Organization
PIC	Pilot in Command
PLH	Airline Pilot License – Helicopter
PPH	Private Pilot License – Helicopter
RBAC	Brazilian Civil Aviation Regulation
REH	Special Helicopter Routes
SBMT	ICAO Location Designator – Campo de Marte Aerodrome - SP
SBSJ	ICAO Location Designator – São José dos Campos Aerodrome - SP
SHRA	Shower Rain
SIIX	ICAO Location Designator – Bira Guimarães Helipad, Igaratá - SP
SIPAER	Aeronautical Accident Investigation and Prevention System
TCU	Towering Cumulus
TPP	Private Air Service Aircraft Registration Category
UTC	Universal Time Coordinated
VCSH	Vicinity Shower
VFR	Visual Flight Rules

1. FACTUAL INFORMATION.

Aircraft	**Model:** A109S **Registration:** PP-UGS **Manufacturer:** Agusta Helicopter	**Operator:** Private
Occurrence	**Date/time:** 13MAR2021 - 2000 UTC **Location:** Rural residential area, Igaratá – SP **Lat.** 23°11'43" S **Long.** 046°05'55" W **Municipality – State:** Igaratá – SP	**Type(s):** [CTOL] Collision with an obstacle during take-off and landing **Subtype(s):** NIL

1.1 History of the flight.

The aircraft took off from the Bira Guimarães Private Helipad (SIIX), Igaratá - SP, to the Campo de Marte Aerodrome (SBMT), São Paulo - SP, to perform a private flight, with a Pilot in Command (PIC) on board.

During the intermediate landing, for passenger boarding, in an unregistered area in Igaratá - SP, the tail rotor blades touched a lighting pole.

The aircraft had light damage.

The pilot left unharmed.

1.2 Injuries to persons.

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

1.3 Damage to the aircraft.

The aircraft had light damage, restricted to the tail rotor.

1.4 Other damage.

There was damage to the light pole.

1.5 Personnel information.

1.5.1 Crew's flight experience.

Flight Hours	PIC
Total	2.570:56
Total in the last 30 days	02:30
Total in the last 24 hours	00:24
In this type of aircraft	341:21
In this type in the last 30 days	02:30
In this type in the last 24 hours	00:24

N.B.: The data relating to the flown hours were obtained through the pilot's statement.

1.5.2 Personnel training.

The PIC took the PPH course at *Escola de Aviação Master*, São Paulo - SP, in 1996.

1.5.3 Category of licenses and validity of certificates.

The PIC had the PLH License and had valid HMLT and IFRH Ratings.

1.5.4 Qualification and flight experience.

The PIC was qualified and had experience in the type of flight, however, it was the first time he had operated in the location.

1.5.5 Validity of medical certificate.

The PIC had a valid CMA.

1.6 Aircraft information.

The aircraft, serial number 22118, was manufactured by Agusta Helicopter in 2009 and was registered in the TPP Category.

The aircraft`s CA was valid.

The airframe and engine logbook records were updated.

The aircraft`s last inspection, the “50 hours/30 days” type, was carried out on 10MAR2021 at the Maintenance Organization Helipark in Carapicuíba - SP, and the aircraft flew 36 minutes after the inspection.

The last more comprehensive aircraft inspection, the “12 months” type, was carried out on 22JAN2021 at the OM Helipark, in Carapicuíba, São Paulo - SP, with the aircraft having flown 5 hours and 18 minutes after the inspection.

The aircraft had 607 total hours at the time of the occurrence.

1.7 Meteorological information.

The locality did not have a meteorological information service.

The METAR from São José dos Campos (SBSJ) - SP, 24 km away from the incident site, provided the following information:

> SBSJ METAR 03/13/2021 131900Z 04005KT 9999 -SHRA SCT040 FEW045TCU BKN090 25/19 Q1015;
>
> SBSJ METAR 03/13/2021 132200Z 13010KT 9999 VCSH SCT040 FEW045TCU BKN100 20/27 Q1015;
>
> SBSJ METAR 03/13/2021 132100Z 14013KT 9999 FEW045TCU 13/26 Q1015;

The visibility was found to be above 10 km and there was little cloud cover at 4,000 ft. The wind had an intensity between 5 kt and 13 kt. There were also some TCU-type rain clouds in the vicinity at 4,500 ft.

Despite rain showers in the vicinity, the pilot did not report interference from meteorology on the approach.

According to reports and analysis of the SBSJ METARs, conditions were considered favorable for the visual flight.

1.8 Aids to navigation.

Nil.

1.9 Communications.

Nil.

1.10 Aerodrome information.

The serious incident took place outside the Aerodrome, close to the site of the previous take-off.

1.11 Flight recorders.

Neither required nor installed.

1.12 Wreckage and impact information.

The impact occurred against a light pole on the final short landing, causing damage to the tail rotor blades, as shown in Figures 1 to 4.

Figure 1 - Final position after the occurrence and highlighting the lighting pole hit by the tail rotor.

Figure 2 - Front view of the aircraft after the occurrence.

Figure 3 - Detail of damage to the tail rotor.

Figure 4 - Detail of the damage to the light pole that was hit.

1.13 Medical and pathological information.

1.13.1 Medical aspects.

Nil.

1.13.2 Ergonomic information.

Nil.

1.13.3 Psychological aspects.

Nil.

1.14 Fire.

There was no fire.

1.15 Survival aspects.

Nil.

1.16 Tests and research.

Nil.

1.17 Organizational and management information.

Nil.

1.18 Operational information.

The weight of the aircraft at the time of the take-off was 2,768 kg and the maximum take-off weight was 3,175 kg.

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

The total capacity of the tanks was 480 kg. The last fueling took place in SBMT with 320 kg and the remaining fuel, at the time of the occurrence, was 420 kg.

According to the Rotorcraft Flight Manual A109S, Rev. 1 of 01JUN2005, this model was 11,648 m long and 10,830 m in diameter of the main rotor, as shown in Figure 5.

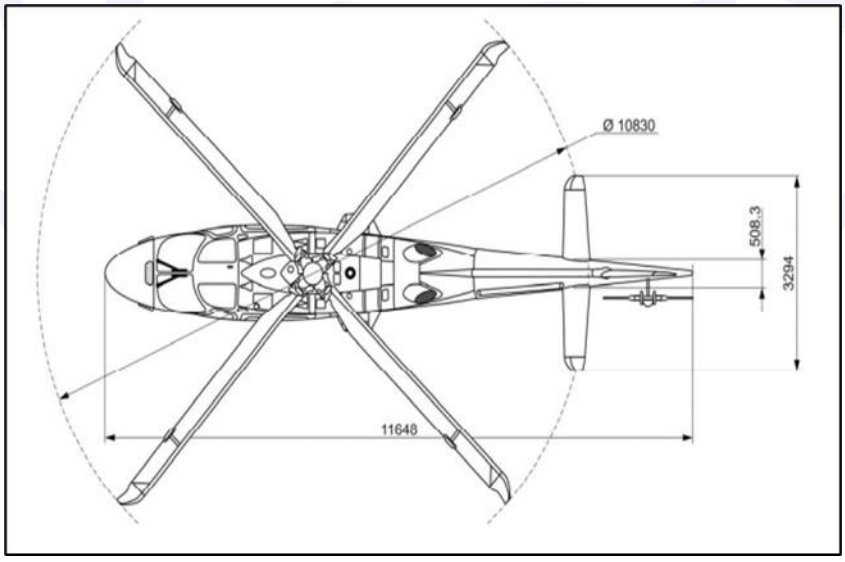

Figure 5 - Dimensions of the A109S model.

The planned itinerary of the flight was to take off from SIIX, land at an unregistered location near the helipad in Igaratá - SP, and head to the destination that was the Campo de Marte Aerodrome (SBMT), São Paulo - SP.

A flight notification was made, under VFR, following the REH and having as an alternative the Professor Urbano Ernesto Stumpf Aerodrome (SBSJ), São José dos Campos - SP.

According to the PIC's report, there were no failures in any systems or components of the aircraft before the occurrence, and landing at the intermediate location would be to carry out the boarding of an elderly passenger, with mobility restriction, to transport him to São Paulo - SP.

The site used was on a hill and about 400 m from SIIX. It was a flat, grassy terrain, surrounded by trees, approximately 50 m high to the Northwest and Southeast, and was close to the house where the passenger was.

The house was Northeast of the landing site for boarding. On the lateral, there were two lamp posts, approximately 5 m high, and a slope of the terrain to the Southwest, as shown in Figure 6.

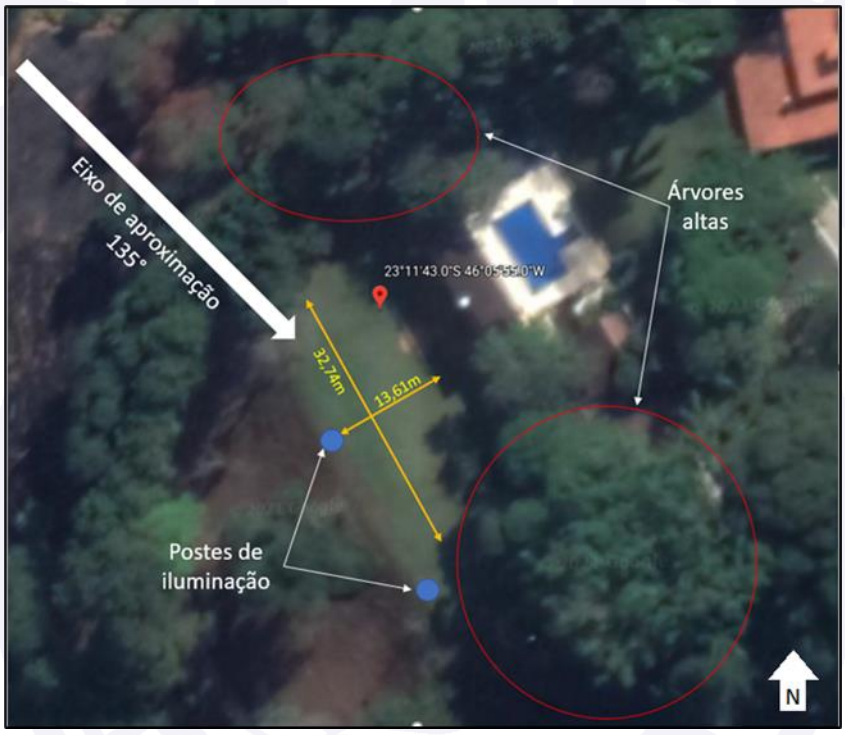

Figure 6 - Sketch of the intermediate landing site.

According to the PIC report, the approach took place on the 135° axis, and he had never made previous approaches to that location. There was no marking in this area and there was also no support from observers on the ground to assist in the approach.

The obstacle-free area of the site was approximately 33 m lengthwise by 14 m across.

The A109S RFM, Supplement 7 - Optional Equipment Supplements CAT A Operations in the Section Performance Data reports for Ground Level Heliport Size the minimum demonstrated heliport/helideck size 15m x 15m (50ft x 50 ft) and all the data related to take-off and landing distances.

There was no communication support on the approach.

In the final part of the approach, the tail rotor blades collided with the top of the lamp post.

1.19 Additional information.

The aircraft was owned by the passenger who would be boarded at the scene of the occurrence.

The RBAC 91, Amendment 2, General Operational Requirements for Civil Aircraft, of the ANAC, valid at the time, previsted the following regarding landings and take-offs from non-registered areas:

> 91,329 Helicopter takeoffs and landings in unregistered areas
>
> (a) Except as provided for in paragraph 91.102(d) of these Regulations, landings, and takeoffs of helicopters in non-registered areas may be carried out, under the full responsibility of the operator, provided that:
>
> (1) the operation is carried out:
>
> (i) in areas:
>
> (A) owned by an individual;
>
> (B) whose public access is restricted; or
>
> (C) uninhabited, **in which there are no boundaries or constructions on the ground that indicate that there may be the presence of people within a radius of 30 meters from the touchdown point (except for those people involved with the operation) (our emphasis);**
>
> (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 on the helicopter is at least 30 meters away from any public access road;
>
> (2) there is no aircraft fueling operation at the location;
>
> (3) there is no prohibition on operation at the chosen location;
>
> (4) the operation is performed under VFR daytime flight rules and VMC conditions;
>
> (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 risk management to ensure an acceptable level of risk to the safety of the operation, the aircraft, its occupants, and third parties.
>
> (b) In the event of natural disasters or emergencies, landings, and takeoffs of helicopters in non-registered areas may be carried out without meeting the criteria of paragraphs (a)(1) to (a)(5) of this section, under the operator's full responsibility.
>
> (c) In the event of any particular situation, not previsted in these Regulations, which causes disturbance to public order, the ANAC may prohibit operations in a certain area, even if that area meets the other criteria in paragraph (a) of this section.
>
> [...]

1.20 Useful or effective investigation techniques.

Nil.

2. ANALYSIS.

No evidence of failure was found in any systems or components of the aircraft before the occurrence, corroborating the statement given by the crew during the interview.

The airframe and engine logbook records were updated.

The take-off location did not have a meteorological information service and, according to the data from the meteorology service closest to the occurrence and the pilot's statement, the conditions were considered favorable for the intended flight and did not influence the occurrence of this incident.

With the survey carried out by the Investigation Team, it was found that the crewmember was qualified and had the necessary experience to perform the flight.

However, it was reported that he had never landed at the occurrence site, which was not registered and had restrictions, due to existing obstacles.

The helicopter belonged to the passenger and was parked at the Bira Guimarães Helipad (SIIX), where the boarding and take-off for SBMT could have taken place. However, because the owner is elderly and has limited mobility, it was decided to take off in SIIX and land on the lawn of the house, where boarding would be facilitated.

The site did not have marking, communication services, or ground observers to assist with the aircraft landing.

Observing the helicopter's dimensions and the landing site's width, it was found that there were about 1.5 m of a margin between the obstacles and the tips of the main rotor blades.

According to the regulations in force at the time, the unregistered landing area should have a minimum free radius of 30 m from obstacles and people up to the touchdown point, for eventual use by helicopters.

Thus, it was inferred that the decision-making process for choosing the landing area did not consider the conditions of the place, and, therefore, correct risk management of that operation was not carried out, which contributed to the occurrence.

Landing in an area with these characteristics, without proper risk management, and without prior planning, in a place that did not have a structure that could assist the operation, such as the marking of the area or even auxiliaries on the ground to direct the helicopter, demonstrated that there was an inadequate assessment of the parameters related to the operation of the aircraft, which contributed to the occurrence.

It was also concluded that, because the passenger had mobility difficulties and because he was the owner of the aircraft, the pilot was motivated to look for a place to facilitate boarding, without properly considering the risks present in that operation, which contributed to the outcome of this serious incident.

3. CONCLUSIONS.

3.1 Facts.

a) the PIC had a valid CMA;

b) the PIC had valid HMLT and IFRH Ratings;

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

d) the aircraft had a valid CA;

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

f) the airframe and engine logbook records were updated;

g) the weather conditions were favorable for the flight;

h) the aircraft took off from SIIX to SBMT with an intermediate landing at an unregistered location;

i) the intermediate landing site had many obstacles around;

j) on the final leg of the landing approach, the tail rotor blades collided with the upper part of the lamp post;

k) the aircraft had minor damage; and

l) the PIC left unharmed.

3.2 Contributing factors.

- **Piloting judgment – a contributor.**

There was an inadequate assessment of the parameters related to the operation of the aircraft when landing in an area of reduced dimensions where there were obstacles, without proper risk management and prior planning, given that it was the first time that the PIC performed the landing in the locality, which did not have a structure that could help the operation, such as markings and auxiliaries on the ground.

- **Motivation – a contributor.**

The passenger who would make the boarding and have mobility difficulties was also the aircraft owner. Thus, it was concluded that the physical condition of the passenger and the bond between them influenced the PIC's decision to land in a place that did not offer adequate conditions for the operation.

- **Flight planning – a contributor.**

The landing in an area with several obstacles which did not offer a support structure for the operation demonstrated that there was inadequate planning, which contributed to the occurrence.

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

The judgment of the operational conditions and the motivation for carrying out the landing in a place that would facilitate the boarding of the passenger, led the PIC to inadequate analysis of the alternatives, contributing to the occurrence.

4. SAFETY RECOMMENDATION.

A proposal of an accident investigation authority based on information derived from an investigation intended to prevent accidents or incidents and 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 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".

None**.**

5. CORRECTIVE OR PREVENTATIVE ACTION ALREADY TAKEN.

None.

On March 23th, 2023.