

COMANDO DA AERONÁUTICA
CENTRO DE INVESTIGAÇÃO E PREVENÇÃO DE
ACIDENTES AERONÁUTICOS



FINAL REPORT
A - 002/CENIPA/2013

OCCURRENCE:	ACCIDENT
AIRCRAFT:	PR-DUB
MODEL:	R66
DATE:	03JAN2013



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 Final Report was provided to ANAC and DECEA so that the technical-scientific analyzes of this investigation can be used as a source of data and information, aiming at the identification of hazards and risk assessment, as established in the Brazilian's Program Operational Safety of Civil Aviation (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 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 03JAN2013 accident with the R66 aircraft model, registration PR-DUB. The accident was classified as “[UIMC] Unintentional IMC”.

During a private flight between the Professor Urbano Ernesto Stumpf Aerodrome (SBSJ), São José dos Campos - SP, and the Maroum Helipad (SJDO), Ilhabela - SP, the aircraft disappeared.

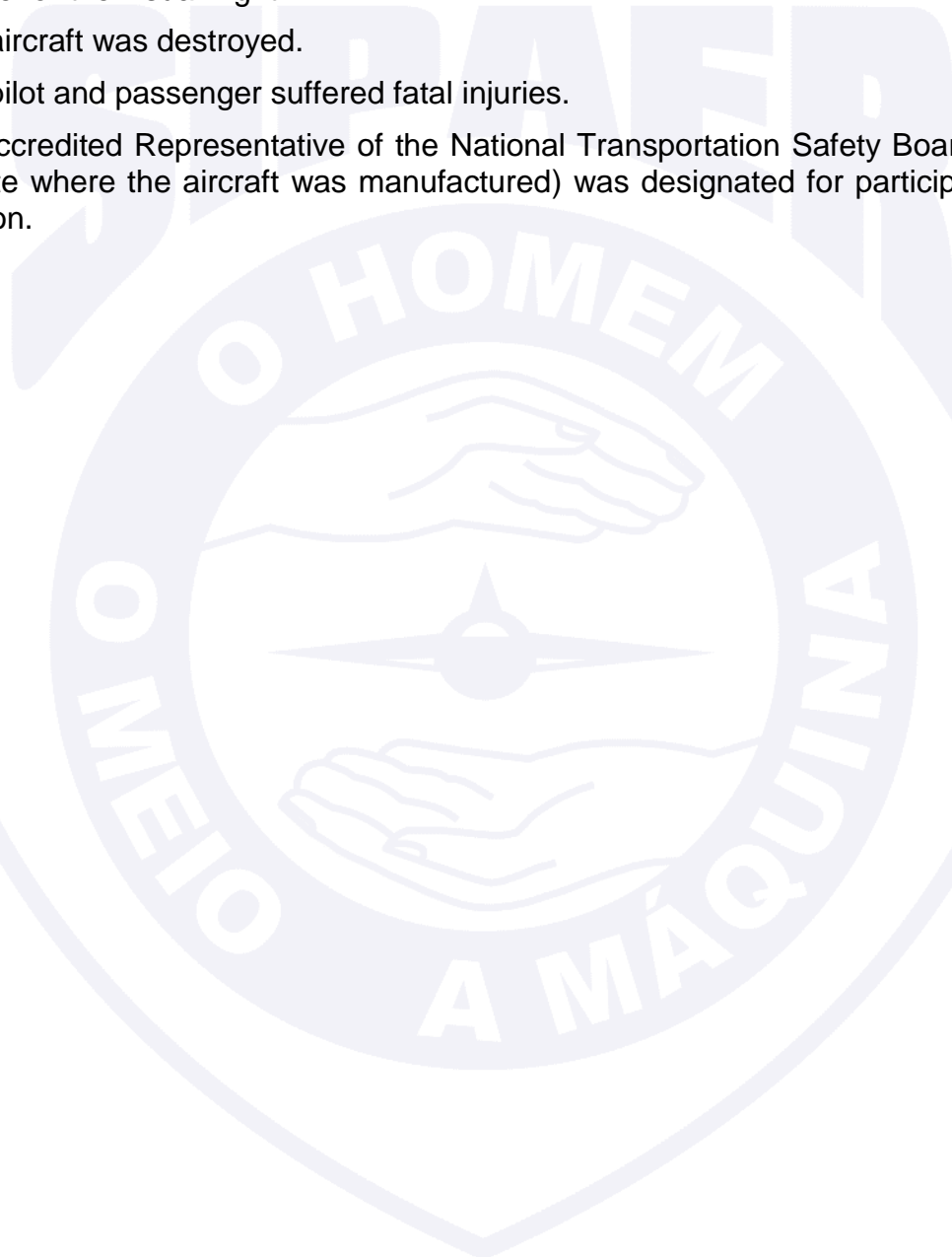
The helicopter collided with a mountainous terrain of native forest, in the Serra do Mar region.

During the analysis, it was found that the meteorological conditions on the route were unfavorable for the visual flight.

The aircraft was destroyed.

The pilot and passenger suffered fatal injuries.

An Accredited Representative of the National Transportation Safety Board (NTSB) - USA, (State where the aircraft was manufactured) was designated for participation in the investigation.



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GLOSSARY OF TECHNICAL TERMS AND ABBREVIATIONS

AGL	Above Ground Level
ANAC	Brazil's National Civil Aviation Agency
ATC	Air Traffic Control
BR	Mist
CA	Airworthiness Certificate
CB	Cumulonimbus
CENIPA	Aeronautical Accident Investigation and Prevention Center
CIAC	Civil Aviation Instruction Centers
CIV	Pilot's Flight Logbook
CMA	Aeronautical Medical Certificate
DZ	Drizzle
FAB	Brazilian Air Force
GRPAe	Air Radio Patrol Group
IAM	Annual Maintenance Inspection
ICA	Command of Aeronautics' Instruction
IFR	Instrument Flight Rules
IFRH	Instrument Flight Rating - Helicopter
IMC	Instrument Meteorological Conditions
METAR	Meteorological Aerodrome Report
NM	Nautical Miles
NTSB	National Transportation Safety Board (USA)
OVC	Overcast (8 oktas)
PM	Military Police
PPH	Private Pilot License – Helicopter
SBSJ	ICAO Location Designator - Professor Urbano Ernesto Stumpf Aerodrome, São José dos Campos - SP
SBST	ICAO Location Designator – Base Aérea de Santos Aerodrome - SP
SIGWX	Significant Weather
SIPAER	Aeronautical Accident Investigation and Prevention System
SJDO	ICAO Location Designator – Maroum Helipad, Ilhabela - SP
TPP	Registration Category of Private Service - Aircraft
UTC	Universal Time Coordinated
VFR	Visual Flight Rules
VMC	Visual Meteorological Conditions

1. FACTUAL INFORMATION.

Aircraft	Model: R66 Registration: PR-DUB Manufacturer: Robinson Helicopter	Operator: Private
Occurrence	Date/time: 03JAN2013 - 1715 UTC Location: Serra do Mar Lat. 23°31'57"S Long. 045°20'34"W Municipality – State: Caraguatatuba – SP	Type(s): "[UIMC] Unintentional IMC" Subtype(s): NIL

1.1 History of the flight.

The aircraft took off from the Professor Urbano Ernesto Stumpf Aerodrome (SBSJ), São José dos Campos - SP, to the Helipad Maroum (SJDO), Ilhabela - SP, at around 1645 UTC, in order to carry out a private flight, with a pilot and a passenger on board.

The last contact with the control agency was made when the aircraft was flying over the city of Redenção da Serra - SP. The wreckage was located in a dense forest, at the Serra do Mar - SP, on 15JAN2013.

The aircraft was destroyed by the impact. The crewmember and the passenger suffered fatal injuries.

1.2 Injuries to persons.

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

1.3 Damage to the aircraft.

The aircraft was destroyed. The transmission assembly, blades and engine were separated from the helicopter's fuselage structure and were severely damaged by the impact (Figure 1).



Figure 1 - Overview of the helicopter site and wreckage.

1.4 Other damage.

None.

1.5 Personnel information.**1.5.1 Crew's flight experience.**

Flight Hours	Pilot
Total	Unknown
Total in the last 30 days	Unknown
Total in the last 24 hours	Unknown
In this type of aircraft	Unknown
In this type in the last 30 days	Unknown
In this type in the last 24 hours	Unknown

N.B.: The Pilot's Flight Logbook was not found.

Partial data, relating to the flown hours, were obtained from the records contained in the Digital CIV of the ANAC, which included 9 hours and 6 minutes.

According to information collected, the pilot would have more total flight hours than those mentioned in the ANAC computerized system, including in the referred aircraft model.

1.5.2 Personnel training.

The pilot took the PPH course – Helicopter, in 2002.

1.5.3 Category of licenses and validity of certificates.

The pilot had the PPH License and had valid R66 Rating.

The pilot did not have the IFRH Rating.

1.5.4 Qualification and flight experience.

Due to the unavailability of the CIV, it was not possible to ascertain the pilot's recent experience on the aircraft.

According to information, the pilot used to travel on the aircraft, both on local flights and to the São Paulo coast, and knew the proposed route. This route had already been completed a few times, however, in visual conditions.

1.5.5 Validity of medical certificate.

The pilot had valid CMA.

1.6 Aircraft information.

The aircraft, serial number 0085, was manufactured by Robinson Helicopter, in 2011, and it was registered in the TPP category.

The helicopter was not certified to fly under IFR rules.

The aircraft had valid Airworthiness Certificate (CA).

The logbook was found next to the wreckage of the aircraft, however, the last sheet filled out referred to a flight on 10OCT2012. There was a record that, on that day, mechanical tests were performed, but without describing where and by whom they were carried out. At the time, the aircraft had 221 hours and 35 minutes total.

Thus, it was not possible to determine the number of total hours of the aircraft at the time of the occurrence, as the entries contained in the logbook were outdated.

According to the engine and airframe logs presented, the last inspections performed were “200h” of engine and “100h/12 months” of airframe, carried out in a certified maintenance organization.

The IAM was valid until 27JAN2013.

1.7 Meteorological information.

There was weather information available to the pilot before the take-off. However, it was not possible to verify whether they were consulted.

Other airmen who flew on the day of the accident reported that conditions on the São Paulo coast and the São Paulo plateau were visual, however, the top of the Serra do Mar was covered by clouds.

Search and rescue operations could not be started immediately after activation, due to the prevailing weather conditions.

The METAR of the Santos Air Base Aerodrome (SBST) at 1600 (UTC) and at 1700 (UTC), the nearest location (60 NM from the wreckage site), had the following information:

METAR SBST 031600Z 0000KT 2000 -DZ BR OVC005 22/21 Q1020 =

METAR SBST 031700Z 0000KT 4000 -DZ BR OVC010 22/21 Q1020=

The SBST's METAR at 1600 UTC indicated 2,000 m of visibility, drizzle (-DZ), haze (BR) and the presence of a covered roof (OVC) at 500 ft AGL. The SBST's METAR at 1700 UTC indicated 4,000 m of visibility, drizzle (-DZ), haze (BR) and the presence of a covered roof (OVC) at 1,000 ft AGL.

The SIGWX chart from the surface to FL250, valid until 1800 UTC on 03JAN2013, indicated the presence of isolated/embedded cumulonimbus (CB) clouds from level FL030, rain showers, cumulonimbus clouds and cloud from 1,800 to 6,000 ft (Figure 2).

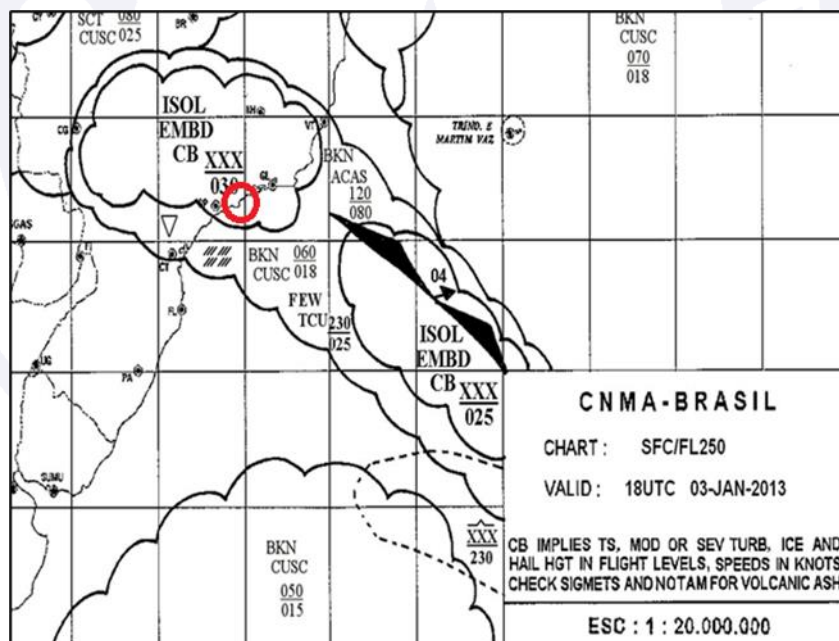


Figure 2 - SIGWX chart valid until 1800 (UTC).

At the Serra do Mar and in the region's valleys, the presence of low temperatures, associated with coastal humidity and vegetation cover, favored atmospheric condensation.

The relief, characteristic of the region, contributed to the occurrence of "mountain circulations", arising from the orography of the place, which favored the convection process and, consequently, the formation of fog and turbulence.

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 was located in a dense forest at the Serra do Mar, near the municipality of Caraguatatuba - SP. The region was steep and the access to the wreckage site was only possible by air.

The approximate altitude of the terrain, where the wreckage was found, corresponded to 2,400 ft, being approximately 39 NM from the take-off site (SBSJ) and 20 NM from the intended landing site. The trees that made up the forest were high and with robust trunks. The average height of the tree tops was 40 meters. The terrain topography was rugged.

The characteristics of the wreckage (high degree of destruction and separation of most components and parts of the aircraft from the fuselage structure) indicated that the impact against the vegetation occurred with great energy.

The cabin, engine and main transmission were destroyed and separated. The shaft that drives the tail rotor has been sectioned. The rear transmission separated, as well as the main rotor blades. The skis also separated and buried in the ground (Figure 3).



Figure 3 - View of the separate tail cone.

Parts and components were thrown linearly and aligned with the direction of displacement.

One of the blades, located next to the wreckage, was not connected to the main rotor assembly and the other was not found during the field investigation.

All components were concentrated within a radius of approximately 250 meters. The "clean" cut characteristic at the top of the trees indicated rotational movement of the main rotor.

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.

There were no survivors.

Aircraft from the FAB and from the GRPAe of the São Paulo Military Police took part in the operation, as well as some civilian helicopters.

Searches began a few days after the accident due to weather conditions.

1.16 Tests and research.

Due to the impossibility of removing the wreckage from the accident site, no examinations and laboratory tests were performed on the aircraft components and systems.

1.17 Organizational and management information.

Nil.

1.18 Operational information.

According to the air traffic rules provided for in the ICA 100-12, Cap V, item 5-2, the following requirements were established:

It will be up to the pilot-in-command of an aircraft, in VFR flight, to arrange for its separation from obstacles and other aircraft through the use of vision, except in Class B airspace, where the separation between the aircraft is the responsibility of the ATC, however, the provisions of 4.2.1 must be observed.

Figure 4, below, describes the intended route and the location of the PR-DUB wreckage.



Figure 4 - Route and location of the PR-DUB wreckage.

The model of aircraft involved in the accident did not have certification for flight under IMC Conditions. In the aircraft flight manual, there was an express limitation for flights to be conducted only under VFR/VMC conditions (weather and visual flight rules).

In addition to the limitation contained in chapter II of the aircraft's flight manual, there was a Safety Notice, SN-18, alerting users to the risks in case of loss of visibility. The recommendation was to take corrective actions in order not to enter a loss of visibility condition (Figure 5).

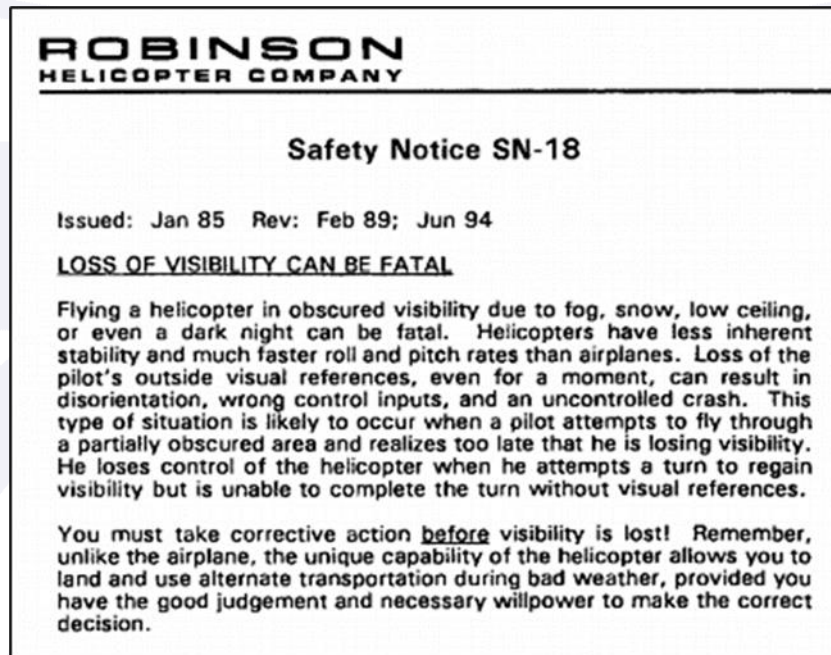


Figure 5 - Safety Notice - Robinson 66 Manual.

1.19 Additional information.

Nil.

1.20 Useful or effective investigation techniques.

Nil.

2. ANALYSIS.

It was a private flight, in which the aircraft took off from SBSJ, at 1645 (UTC), to SJDO, with a pilot and a passenger on board.

The flight took place within the VFR, so that it was necessary to fly under VMC, making possible cloud deviations, maintaining separation from obstacles and other aircraft through the use of vision.

The pilot had a PPH License and valid R66 Rating. However, he was not qualified to fly under instrument flight rules.

According to the meteorological information available at the time of the take-off from SBSJ, there was no restriction for carrying out the initial stage of the flight under visual conditions. However, the meteorological analysis of the route presented an atmosphere favorable to significant changes, mainly at the Serra do Mar.

The pilot, according to information, used to travel in the aircraft both on local flights and towards the São Paulo coast, thus knowing the proposed route. This route had already been completed a few times, however, under visual flight conditions.

The helicopter was not certified for flights under IMC.

Given the disposition of the wreckage, which showed an impact with high energy during the crash, associated with the meteorological conditions prevailing at the crash site, the hypothesis that the aircraft was flying IMC at the time of the accident was considered.

Existing circumstances may have restricted the flight conditions the pilot was used to, resulting in the loss or limitation of visual references that could be used for the flight.

Flight continuity may have been based on an inaccurate assessment of adverse weather conditions and compliance with minimum requirements for VFR flight.

Thus, it is possible that the pilot has suffered the effects of spatial disorientation in flight, losing visual references, causing the collision with the terrain.

3. CONCLUSIONS.

3.1 Facts.

- a) the pilot had valid CMA;
- b) the pilot had valid R66 Rating;
- c) the pilot did not have IFRH Rating;
- d) the aircraft had valid CA;
- e) the aircraft was not certified to fly under IFR rules;
- f) the airframe and engine logbook records were outdated;
- g) the meteorological conditions at the crash site were not favorable to carrying out the VMC flight;
- h) the aircraft collided with the Serra do Mar;
- i) the aircraft was destroyed; and
- j) the pilot and passenger suffered fatal injuries.

3.2 Contributing factors.

- **Adverse meteorological conditions – a contributor.**

The adverse weather conditions at the crash site, predominantly IMC, contributed to the pilot losing visual references with the ground, providing the collision with the terrain.

- **Disorientation – undetermined.**

It is possible that the pilot suffered the effects of spatial disorientation in flight, by losing visual references to the terrain.

- **Flight planning – undetermined.**

It is possible that, during the preparation work for the flight, the meteorological conditions existing on the route were not considered, which would denote poor planning, since there was information available regarding meteorology.

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-002/CENIPA/2013 - 01

Issued on 02/09/2022

Disseminate the lessons learned in this investigation to the CIAC, focused on the training and qualification of helicopter pilots, in order to alert students about the importance of careful assessment of the meteorological conditions of the route, which should be compatible with the type of flight to be performed by its aircraft and pilots.

5. CORRECTIVE OR PREVENTATIVE ACTION ALREADY TAKEN.

None.

On February 09th, 2022.