

COMMAND OF AERONAUTICS
AERONAUTICAL ACCIDENT INVESTIGATION AND
PREVENTION CENTER



FINAL REPORT
A - 004/CENIPA/2014

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|---------------------------|---------------------|
| <u>OCCURRENCE:</u> | ACCIDENT |
| <u>AIRCRAFT:</u> | PR-DOC |
| <u>MODEL:</u> | B200GT |
| <u>DATE:</u> | 28 JULY 2012 |



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 item 3.1, 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.

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SYNOPSIS

This is the Final Report of the 28 July 2012 accident involving the B200GT aircraft, registration PR-DOC. The accident was classified as Controlled Flight into Terrain (CFIT).

During an IFR approach procedure, the aircraft collided with the ground on the final approach.

All aircraft occupants (two crew and six passengers) perished in the crash.

The aircraft was completely destroyed.

An accredited representative from National Transportation Safety Board (USA) was designated for participation in the investigation.

GLOSSARY OF TECHNICAL TERMS AND ABBREVIATIONS

| | |
|--------|--|
| ANAC | (Brazil's) National Civil Aviation Agency |
| ATS | Air Traffic Services |
| CENIPA | (Brazil's) Aeronautical Accident Investigation and Prevention Center |
| CFIT | Controlled Flight Into Terrain |
| CHT | Technical Qualification Certificate |
| CVR | Cockpit Voice Recorder |
| DCTA | Department of Science and Airspace Technology |
| EGPWS | Enhanced Ground Proximity Warning System |
| GEIV | Inflight Inspection Special Group |
| GNSS | Global Navigation Satellite System |
| IAE | Institute of Aeronautics and Space |
| IAM | Annual Maintenance Inspection |
| ICA | Command of Aeronautics' Instruction |
| IFR | Instrument Flight Rules |
| Lat | Latitude |
| Long | Longitude |
| MDA | Minimum Descent Altitude |
| METAR | Routine Meteorological Aerodrome Report |
| MLTE | Multi-Engine Land Airplane |
| NTSB | National Transportation Safety Board (USA) |
| PCM | Commercial Pilot (Airplane category) |
| PLA | Airline Transport Pilot (Airplane category) |
| PPR | Private Pilot (Airplane category) |
| RNAV | Area Navigation |
| SBBH | ICAO location designator – <i>Belo Horizonte</i> Aerodrome |
| SBJF | ICAO location designator – <i>Juiz de Fora</i> Aerodrome |
| SNNU | ICAO location designator – <i>Nanuque</i> Aerodrome |
| SERIPA | Regional Aeronautical Accident Investigation and Prevention Service |
| SINART | National Road and Tourism Support Society |
| SIPAER | Aeronautical Accident Investigation and Prevention System |
| TPP | Private Air Service |
| UTC | Coordinated Universal Time |
| VFR | Visual Flight Rules |

| | | |
|-------------------|---|--|
| AIRCRAFT | Model: B200GT Registration: PR-DOC Manufacturer: Hawker Beechcraft | Operator: Domingos Costa Ind. Alimentícias S.A. |
| OCCURRENCE | Date/time: 28JUL2012 / 10:45 UTC Location: Francisco de Assis Aerodrome Lat. 21°48'00"S – Long. 043°23'13"W Municipality – State: Juiz de Fora – MG | Type: Controlled Flight Into Terrain |

1 Factual information

1.1 History of the occurrence

The aircraft departed from SBBH at 10:00 UTC, destined for SBJF, with two crewmembers and six passengers on board, on a private air service flight.

In contact with *Juiz de Fora* Radio, the crew learned that the weather conditions at the aerodrome were below the IFR minima due to mist, and decided to maintain the route towards the destination and perform a non-precision RNAV (GNSS) IFR approach for landing on runway 03.

During the final approach, the aircraft collided first with obstacles and then with the ground, at a distance of 245 meters from the runway 03 threshold, and exploded on impact.

1.2 Injuries to persons

| Injuries | Crew | Passengers | Third Parties |
|-----------|------|------------|---------------|
| Fatal | 02 | 06 | - |
| Serious | - | - | - |
| Minor | - | - | - |
| Uninjured | - | - | - |

1.3 Damage to the aircraft

The aircraft was completely destroyed.

1.4 Other damage

Nil.

1.5 Personnel information

1.5.1 Information on the crew

| | HOURS FLOWN | |
|-----------------------------------|-------------|---------|
| | PILOT | COPILOT |
| Total | 14,170:00 | 730:00 |
| Total in the last 30 days | 10:00 | 10:00 |
| Total in the last 24 hours | 00:45 | 00:45 |
| In this type of aircraft | 2,170:00 | 415:00 |
| In this type in the last 30 days | 10:00 | 10:00 |
| In this type in the last 24 hours | 00:45 | 00:45 |

NB.: The only information recorded in the Pilots' log book referred to April 2012. The data relative to the total flight hours of the last 30 days were estimated from the monthly average of the pilots per aircraft.

1.5.1.1 Professional formation

The pilot did his Private Pilot course (Airplane category) in the *Pará de Minas, MG*, Flying School in 1984.

The copilot did his Private Pilot course (Airplane category) in the *Pará de Minas, MG*, Flying School in 2006.

1.5.1.2 Validity and category of licenses and certificates

The pilot had an Airline Transport Pilot (ATP) license, and valid technical qualifications relative to the B200 aircraft, Airplane Multi-Engine Land (AMEL), and IFR rating.

The copilot had a Commercial Pilot license (Airplane category), and valid technical qualifications relative to the B200 aircraft, Airplane Multi-Engine Land (AMEL), and IFR rating.

1.5.1.3 Qualification and flight experience

The pilots were qualified and had enough experience for the flight in question.

1.5.1.4 Validity of the medical certificate

The pilots had valid aeronautical medical certificates.

1.6 Aircraft information

The SN BY-051 airplane was manufactured by Hawker Beechcraft in 2008.

The aircraft had a valid airworthiness certificate.

The airframe, engine and propeller logbooks' records were up-to-date.

The last aircraft inspection (Annual Maintenance Inspection) was carried out on 16 July 2012 by the *LÍDER SIGNATURE S/A* workshop in Belo Horizonte (State of Minas Gerais), complying with the phase 3 and 4. The aircraft had flown a total of 45 minutes after the inspection.

The Pratt & Whitney PT6A-52 turboprop engines (SN RX0107 and PCE-RX0108) were installed in the aircraft since new, and, due to their few hours of operation, had not undergone either hot section inspection or overhaul.

The aircraft had a total operating time of 385 hours, with 305 landings.

From the aircraft maintenance records, it was possible to observe that the maintenance of the aircraft was being performed in accordance with the manufacturer's recommendations.

1.7 Meteorological information

When the flight plan was filed in SBBH, the meteorological conditions in SBJF were the following:

28/07/2012 SBJF 280900Z METAR SBJF 280900Z 21002KT 5000 BR SCT005 SCT007 14/14 Q1023=; indicating the possibility of an IFR procedure for landing at the aerodrome.

28/07/2012 SBJF 280920Z SPECI SBJF 280920Z 21003KT 2000 BR OVC004 14/14 Q1023=.

At 09:20 UTC, a special weather report (SPECI) was issued, alerting that the meteorological conditions at SBJF were below the IFR minima, due to a ceiling of 400ft formed by mist.

At 10:30 UTC, during their first contact with *Juiz de Fora* Radio, the crew learned of the weather conditions and was informed that the ceiling had worsened to 100ft.

There was no weather forecast relative to an opening of the aerodrome after 11:00 UTC.

1.8 Navigational aids

SBJF possesses homologated IFR approach procedures. The crew chose to perform the runway 03 RNAV (GNSS) non-precision approach procedure.

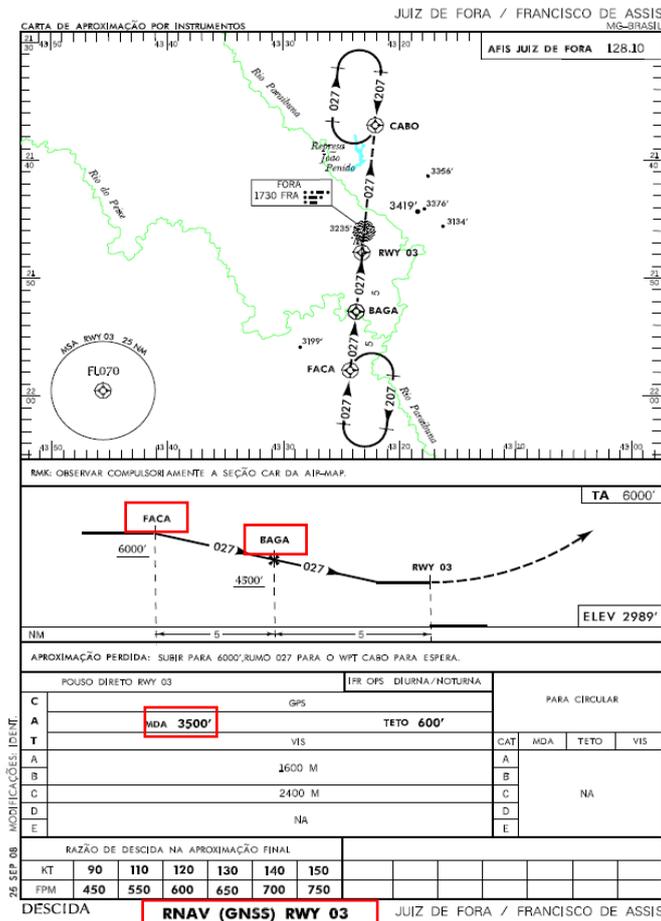


Figure 1 - RNAV(GNSS) Approach Chart for RWY 03.

According to the post-accident Inflight Inspection Final Report issued by the Special Group of Inflight Inspection (GEIV), the SBJF RNAV procedure utilized by the crew was considered satisfactory, and in accordance with the requisites and prescribed standards.

1.9 Communications

The two-way communication between the crew and the ATC units were uneventful.

The first contact of the aircraft with *Juiz de Fora* Radio took place at 10:30 UTC, and the Radio Station operator informed the crew about the altimeter setting and about the aerodrome weather conditions, which were below the minima for IFR operations, with a ceiling of 100ft.

Aware of the meteorological conditions, the crew informed that they would perform the RWY 03 RNAV (GNSS) procedure. Following instructions given by the Juiz de Fora Radio operator, the crew reported (as should be expected) the FACA and BAGA positions, prescribed in the procedure.

Upon crossing BAGA position, the crew was again informed of the altimeter setting by the *Juiz de Fora* Radio operator, and was instructed to report, at the MDA, whether the runway in sight or commencing the go-around.

The crew did not report reaching the MDA of the procedure to *Juiz de Fora* Radio, contrary to what was prescribed in item 15.24 of the ICA 100-12 (Rules of the Air and Air Traffic Service).

Juiz de Fora Radio no longer had contact with the aircraft after BAGA position. The radio operator received a phone call informing that an aircraft had crashed near the runway 03 threshold.

Juiz de Fora Radiostation never told the crew whether there was a meteorological forecast regarding an opening of the aerodrome after 11:00 UTC.

1.10 Aerodrome information

The aerodrome was public, under the administration of the SINART (National Society for Road and Tourism Support), and operated both VFR and IFR, during day- and night-time.

The runway was paved with asphalt, with thresholds 03/21, dimensions 1,535m x 30m, at an elevation of 2,989ft.

1.11 Flight recorders

The aircraft was equipped with the CVR FA2100, PN2100-1010-00.

The CVR read-out was performed at the CENIPA Labdata, where the last 30 minutes of audio were retrieved (Pilot-Copilot and Crew-SBJF Radio Operator communications).

From the voice data obtained, it became evident that: the crew was aware of the SBJF weather conditions; the crew had the intention to perform an IFR approach procedure; and the crew had the intention of making as many orbits as necessary before the mist dispersed.

During the descent procedure, the pilot informed the copilot that he would maintain the flight parameters prescribed in the procedure, and asked the copilot to look out, trying to obtain visual contact with the ground.

It was verified that the aircraft continued the descent after the MDA until colliding with the first obstacle (a tree) and loss of communication.

The aircraft EGPWS was functioning normally and emitted the prescribed ground proximity alerts (MINIMUM, TERRAIN and PULL UP).

The copilot informed the pilot when the aircraft passed the altitudes of 3,400ft, 3,300ft, 3,200ft, and 3,100ft, all of which below the MDA.

It was observed that the crew, on two occasions, received the altimeter setting information transmitted by *Juiz de Fora* Radio. The altimeter setting information was relayed to the aircraft captain by the copilot.

1.12 Wreckage and impact information

The first impact of the aircraft was against a tree at a distance of 245 meters from the runway threshold, at an elevation of 3,000ft.

Then, it collided with the ceiling of a kiosk of a resort known as *Pousada Hotel Aconchego de Minas* (at his moment, part of the right wing apparently detached, causing a leak of fuel). In the sequence, the aircraft hit the high voltage wires of the referred resort (with the resulting sparks igniting the fuel in the aircraft).

After moving approximately two hundred meters farther, the aircraft collided with the ground, and exploded on impact. The severity of the damage and the charring of the aircraft hindered a better verification of the aircraft equipment and instruments.

The final impact occurred 50ft below the level of the runway 03, with the trajectory of the aircraft aligned with the runway axis.



Figure 2 – Aspect of the wreckage.

The distribution of the wreckage was of the linear type.

1.13 Medical and pathological information

1.13.1 Medical aspects

The pilot's medical records had no information concerning the use of medication.

The pilot had undergone a minor surgery on 10 July 2012, and was discharged from hospital the next day.

In an interview, the doctor who operated on the pilot reported that this latter had displayed a post-operative period with no complications. The doctor also said that, according to pilot's last medical evaluation on 23 July 2012, his health condition was good, with no restriction for flying.

As for the copilot, there is nothing of relevance to be reported.

1.13.2 Ergonomic information

Nil.

1.13.3 Psychological aspects

1.13.3.1 Individual information

In interviews with other pilots, it was possible to identify that the pilot had a “*laissez-faire*” leadership style, with little “firmness” concerning the control of operational situations, in need of an assertive person to draw his attention to the perception of hazards in a situation of risk.

The copilot, in addition to being a timid person, showed very strong “respect” for the captain.

1.13.3.2 Psychosocial information

On 13 June 2009, the pilot got involved in an aeronautical accident with the aircraft PT-LQE in SNUU. In the accident, the aircraft landing gear collided with a car parked near the runway threshold.

When questioned about the occurrence, he would always respond that the responsibility for the accident was not his, but of the other person involved in the mishap.

He did not like to do trainings in the simulator or be submitted to check rides, and would even operate the aircraft with his technical qualification certificate expired, making use of the certificates of his copilots.

He used to affirm that just a basic knowledge was enough for operating the equipment.

1.13.3.3 Organizational information

There was a relationship of mutual confidence between the pilot and the owner of the company which operated the aircraft. The company owner did not get involved in the crew’s operational issues, such as knowledge updating, check rides, and flight simulator training, even after the accident of 2009.

Although no episodes of organizational pressure on the crew could be identified concerning the compliance with the flights, the pilot, on account of his relationship of confidence with the owner, would always make every effort in order to accommodate the demands of his employer.

1.14 Fire

The fire started after the sequence of impacts of the aircraft right wing with the kiosk and the resort’s high tension wires.

The combustion material was the very fuel of the aircraft, and the ignition source were the electric sparks generated by the high tension wires.

Although the aerodrome could count on an adequate fire-fighting service, it was not possible to extinguish the aircraft fire on account of the speed of the fire spreading and the difficulty accessing the crash-site.

The aerodrome fire-fighting service prevented the fire from spreading and damaging the nearby residences.

1.15 Survival aspects

Nil.

1.16 Tests and research

The Aeronautical Propulsion Division of the IAE/DCTA disassembled and analyzed the engines of the accident aircraft, and issued the Investigation Report RI-APA 43/2012.

In the hot section of the engines, it was possible to observe pronounced grooves made by the rotating components of both the compressor turbine and by the power-turbine stages.

In addition to the marks left in the internal components of the engines, plastic deformation was observed in the metal sheets of the exhausts and in the hot regions, on account of high temperature.

The lubricating system was operating adequately.

The propellers showed evidence that, at the moment of impact, they had adequate rotation and torque for the phase of flight.

Considering the aforementioned observations, the report concluded that there was evidence that the engines were functioning normally and developing power at the moment of impact.

1.17 Organizational and management information

The aircraft was operated by a company by the name of *DOMINGOS COSTA IND. ALIMENTICIAS S.A.*, in the private passenger transport category. The crew consisted of two pilots, both of whom had a hiring contract with the company.

The owner of the company which operated the aircraft showed full confidence in the operational performance of the pilots and in their ability of managing the issues concerning the aircraft.

All the management relative to the aircraft maintenance and pilots' training was under the responsibility of the pilot, who had been an employee of the company for five years and had an excellent relationship with the employer.

1.18 Operational aspects

Upon filing the flight plan, the crew became aware of the METAR SBJF 0900, which indicated favorable conditions for an instrument approach procedure in that aerodrome.

The crew departed from SBBH at 10:00 UTC, destined for SBJF, unaware of the 0920Z SPECI of SBJF, containing information that the meteorological conditions in SBJF had worsened, and were below the IFR minima on account of mist, with a ceiling of 400ft.

At 10:30 UTC, in contact with *Juiz de Fora* Radio, the crew was informed of the meteorological conditions contained in the SPECI, and received information that the ceiling had lowered to 100ft.

The crew decided to proceed to SBJF and perform the RWY 03 RNAV (GNSS) non-precision procedure, with an ETA of 10:45 UTC.

At the descent briefing, the pilots agreed to make as many orbits as necessary while waiting for the mist to disperse.

On the final approach of the procedure, the captain informed the copilot that he would maintain the parameters of the flight/procedure, and that the copilot was to look out in the attempt to get visual contact with the ground.

Upon reaching the MDA (3,500ft), and not obtaining visual contact with the runway, the crew continued descending below the MDA (no attempt to go around) until colliding with obstacles and with the ground.

While the aircraft was descending below the MDA, the copilot reported the aircraft altitudes of 3,400ft, 3,300ft, 3,220ft and 3,100ft to the pilot. The EGPWS emitted ground proximity alerts (MINIMUM, TERRAIN and PULL UP).

The copilot was less experienced than the pilot, both in terms of hours flown in the aircraft and in terms of air activity.

No evidence was found that the crew might have forgotten to insert the altimeter setting.

The ICA 100-12 (Rules of the Air and Air Traffic Services), item 10.4.1, establishes that the descent in a direct landing procedure is limited to the MDA or DA, and that the pilot may proceed for landing only if he/she obtains visual contact with the runway or approach lights.

If visual contact is not obtained, it is mandatory for the crew to start the missed approach procedure.

1.19 Additional information

The pilot was involved in an aeronautical accident with the aircraft PT-LQE in SNNU on 13 June 2009. The aerodrome only operated VFR, but the aircraft captain improvised a GPS-based IFR descent, on a final approach not aligned with runway, touching the ground short of the runway, and colliding with a vehicle parked on a road near the runway threshold.

The Final Report of the accident was issued by the CENIPA on 29 August 2011.

The report lists several operational aspects that were contributing factors to the accident, among them flight indiscipline, and a recommendation to the company operating the aircraft demanding the company to advise its crews on the compliance with the rules relative to VFR flights contained in the ICA 100-12, for this case in particular.

1.20 Utilization of other investigation techniques

Nil.

2 ANALYSIS

The aircraft departed from SBBH at 10:00 UTC on a private air service flight destined for SBJF, with six passengers and two crewmembers on board.

At 10:30 UTC, by means of a radio contact with *Juiz de Fora* Radio, the crew was informed that the weather conditions at the aerodrome were below the IFR minima due to mist. The crew decided to proceed to SBJF, and perform a non-precision RNAV (GNSS) IFR procedure for landing on runway 03.

On the final approach, the crew continued descending after passing the MDA, causing the aircraft to collide with obstacles and then with the ground at a distance of 245 meters from the runway threshold.

In the investigation, the commission verified that the aircraft weight and balance was within the operational limits. According to a technical report issued by the DCTA, the engines were running normally and developing power at the moment of the impact.

In relation to the meteorology, it was observed that the crew was aware of the 0900Z METAR SBJF, with information of weather favorable for IFR operations in the aerodrome. However, the crew did not learn of the 09:20 UTC SPECI, containing information on the worsening of the meteorological conditions (below IFR minima, with a ceiling of 400ft on account of mist).

Nonetheless, on their first contact with *Juiz de Fora* Radio (at 10:30 UTC), the crew was informed of the meteorological conditions contained in the SPECI. And that the ceiling had degraded to 100ft. Therefore, one may exclude the possibility of a surprise factor affecting negatively the actions taken by the crew while they were performing the IFR descent procedure.

The crew decided to proceed with the flight, even after learning of the meteorological conditions prevailing at the destination aerodrome.

During the descent briefing, they agreed to make as many orbits as necessary until the mist dispersed.

According to his information, one understands that, if the weather conditions remained unfavorable, the crew would either not start the descent procedure or they would perform the missed approach procedure at the MDA (3,500ft) if they failed to obtain visual contact with the runway.

From the CVR voice recordings, it became evident that the decision to proceed to SBJF in those weather conditions and perform the IFR procedure was based on an expectation (possibly generated by the crew's experience or by a certain culture of the pilots who fly in that region) that the mist would eventually disperse, making it possible to obtain visual contact with the terrain during the procedure.

At the beginning of the procedure, the pilot informed the copilot that he (the pilot) would maintain the flight parameters/procedure, while the copilot was to look out in the attempt to obtain visual contact with the terrain (thus implying that he did not have the intention to start a go-around at the MDA).

This moment shows a breach of doctrine in the cockpit, evidenced by the contradiction between the posture of the crew during the descent briefing and the execution of the procedures during the final approach.

In interviews with other pilots, it was possible to identify that the pilot had a *Laissez-Faire* leadership style, with little firmness in relation to the control of the operational situations, in need of an assertive person to draw his attention to the perception of hazards during a situation of risk.

The copilot, in addition to being a timid person, would always show a very strong respect for the captain.

These personal characteristics of the crew contributed to an inadequate management of the available cockpit resources, resulting in failures of communication between the pilots, which ended up harming the construction of a decision-making process.

The crew failed to comply with the legislation in force, disobeying the prescriptions of the items 10.4 and 15.24 of the ICA 100-12 (Rules of the Air and Air Traffic Services).

In relation to the first item (10.4), they reached the MDA and, even without establishing visual contact with the runway, they deliberately continued with the descent below the MDA; in relation to the second item (15.24), they did not pass the information to *Juiz de Fora* Radio, telling that they were passing the MDA of the procedure.

The non-observance of these two procedures contributed to the outcome of the occurrence in a decisive manner, since the utilization of standard radiotelephony communication on the part of the crew would have enabled the radio station operator to alert the crew about the second violation (being below the MDA without having the runway in sight). The result would have been a reinforcement of the crew's situational awareness for a possible go-around, which might have avoided the accident.

The crew never showed a reaction denotative of their intention to go around, although the copilot informed the captain that they were passing the altitudes of 3,400ft, 3,300ft, 3,220ft, and 3,100ft, and despite the fact that the EGPWS emitted ground-proximity alerts (MINIMUM, TERRAIN, and PULL UP).

The investigation analyzed the hypothesis that the pilots did not insert either the altimeter setting for performing the procedure or inserted a wrong value, which would result in an indication of altitude different from the real one.

However, it was observed that the crew, on two occasions, received the altimeter setting from the *Juiz de Fora* Radio operator, and the copilot repeated it correctly to the pilot, denoting that they knew the correct value of the altimeter setting.

The fact that the copilot repeated accurately the altimeter setting value received, would not in itself, exclude the above hypothesis. However, there was coherence between the copilot information of the altitudes being passed (from the MDA to the moment of the first impact) and the profile of the chart of the procedure being performed, and, so, the conclusion is that there was a correct insertion of the altimeter setting.

3 CONCLUSIONS

3.1 Facts

- a) The pilots had valid medical certificates;
- b) The pilots had valid technical qualification certificates;
- c) The pilots were qualified and had enough experience for the flight;
- d) The aircraft had a valid airworthiness certificate;
- e) The aircraft was within the limits of weight and balance;
- f) Upon filing the flight plan, the crew learned of the SBJF 0900Z METAR, which indicated that the weather was favorable for IFR procedures in the aerodrome;
- g) The aircraft departed from SBBH at 10:00 UTC, destined for SBJF, with two pilots and six passengers on board, on a private air service;
- h) The crew was not aware of the 0920Z UTC SPECI, with information that the weather conditions in SBJF had deteriorated and were below the minima for IFR operations, with a ceiling of 400ft;
- i) At 10:30 UTC, on their first contact with *Juiz de Fora* Radio, the crew was informed of the weather conditions in SBJF by means of a SPECI, which indicated that the ceiling had lowered to 100ft;
- j) The crew decide to proceed to SBJF and perform the RWY 03 RNAV (GNSS) non-precision procedure, estimating their landing at 10:45 UTC;
- k) On the final approach, the aircraft collided with obstacles and then with the ground, at a distance of 245 meters from the runway 03 threshold, and exploded on impact;

- l) The aircraft was completely destroyed in the crash; and
- m) The pilots and the passengers were killed in the accident.

3.2 Contributing factors

3.2.1 Human Factor

3.2.1.1 Medical Aspect

Not a contributor.

3.2.1.2 Psychological Aspect

3.2.1.2.1 Individual information

a) Attitude – undetermined

The pilot may have displayed a complacent attitude, both in relation to the operation of the aircraft in general and to the need to accommodate his employers' demands for arriving in SBJF. It is also possible to infer a posture of excessive self-confidence and confidence in the aircraft, in spite of the elements which signaled the risks inherent to the situation.

3.2.1.2.2 Psychosocial information

a) Communication – undetermined

It is possible that the different levels of experience of the two pilots, as well as the copilot's personal features (besides being timid, he showed an excessive respect for the captain), may have resulted in a failure of communication between the crewmembers.

b) Team dynamics – undetermined

It is possible that the captain's leadership style and the copilot's personal features resulted in lack of assertive attitudes on the part of the crew, hindering the exchange of adequate information, generating a faulty perception in relation to all the important elements of the environment, even with the aircraft alerts functioning in a perfect manner.

3.2.1.2.3 Organizational information

Not a contributor.

3.2.2 Operational Factor

3.2.2.1 Concerning the operation of the aircraft

a) Adverse meteorological conditions – a contributor

The meteorological conditions in SBJF were below the minima for IFR operations on account of mist, with a ceiling at 100ft.

b) Cockpit coordination – a contributor

The management of the available cockpit resources was not appropriate, resulting in failure of communication between the pilots, affecting the construction of the decision-making process.

c) Flight indiscipline – a contributor

The crew did not inform *Juiz de Fora* Radio about their passage of the MDA and, even without visual contact with the runway, deliberately continued in their descent, not

complying with the prescriptions of the items 10.4 and 15.4 of the ICA 100-12 (Rules of the Air and Air Traffic Services).

d) Piloting Judgment – a contributor

The crew judged that it would be possible to continue descending after the MDA, even without having the runway in sight.

3.2.2.2 Concerning ATS units

Not a contributor.

3.2.3 Material Factor

3.2.3.1 Concerning the aircraft

Not a contributor.

3.2.3.2 Concerning ATS technology systems and equipment

Not a contributor.

4 FLIGHT 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 liability.

In accordance with the Law n°12970/2014, recommendations are made solely for the benefit of the air activity operational safety.

Compliance with a Safety Recommendation is the responsibility of the holder of the highest executive position in the organization to which the recommendation is being made. An addressee who judges to be unable to comply with a Safety Recommendation must inform the CENIPA on the reason(s) for the non-compliance.

Safety Recommendations made by the CENIPA:

To the National Civil Aviation Agency (ANAC):

A-004/CENIPA/2014 - 001

Issued on 15/07/2014

Publicize the content of this report at seminars, lectures and similar activities aimed at owners, operators and explorers of aircraft operating under the RBAC 135 and 91.

5 CORRECTIVE/PREVENTATIVE ACTION ALREADY TAKEN

None.

6 DISSEMINATION

- National Civil Aviation Agency (ANAC - Brazil)
- National Air Traffic Control Department (DECEA -Brazil)
- National Transportation Safety Board (NTSB - USA)
- Domingos Costa Ind. Alimentícias S.A.*
- Brazilian General Aviation Association (ABAG)

–Brazilian Air-Taxi Association (ABTAER)

–SERIPA III

7 APPENDICES

Nil.

On 15 / Jul / 2014.