

COMANDO DA AERONÁUTICA
CENTRO DE INVESTIGAÇÃO E PREVENÇÃO DE
ACIDENTES AERONÁUTICOS



FINAL REPORT
A-139/CENIPA/2015

OCCURRENCE:	ACCIDENT
AIRCRAFT:	PR-DMT
MODEL:	150H
DATE:	22OCT2015



NOTICE

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

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

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

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

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

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

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

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

SYNOPSIS

This is the Final Report of the 22OCT2015 accident with the 150H aircraft, registration PR-DMT. It was classified as “Loss of Control in Flight”.

On a local instruction flight, while conducting a simulated engine-out training maneuver, there was loss of control of the aircraft, which collided against the ground.

The aircraft suffered substantial damage.

The Instructor and the student suffered fatal injuries.

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



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GLOSSARY OF TECHNICAL TERMS AND ABBREVIATIONS

ANAC	National Civil Aviation Agency
CA	Airworthiness Certificate
CENIPA	Aeronautical Accident Investigation and Prevention Center
CMA	Aeronautical Medical Certificate
IAE	Aeronautics and Space Institute
IAM	Annual Maintenance Inspection
IFRA	Instrument Flight Rating - Airplane
INVA	Flight Instructor Rating - Airplane
MNTE	Qualification Type – Airplane Single Engine Land
NTSB	National Transportation Safety Board
PCM	Commercial Pilot License - Airplane
PPR	Private Pilot License - Airplane
PRI	Private Aircraft Registration Category - Instruction
SACI	Integrated Civil Aviation Information System
SDWC	ICAO location designator – Agropastoril Bom Pastor Aerodrome - MT
SERIPA	Sixth Regional Aeronautical Accidents Investigation and Prevention Service
SIPAER	Aeronautical Accidents Investigation and Prevention System
TPP	Registration Category of Private Aircraft Service
UTC	Universal Time Coordinated
VFR	Visual Flight Rules

1. FACTUAL INFORMATION.

Aircraft	Model: 150H Registration: PR-DMT Manufacturer: Cessna Aircraft	Operator: Private
Occurrence	Date/time: 22OCT2015 - 1130 UTC Location: Agropastoril Bom Pastor Aerodrome Lat. 16°27'56"S Long. 054°42'43"W Municipality – State: Rondonópolis - MT	Type(s): Loss of Control in Flight Subtype(s): Nil.

1.1 History of the flight.

The aircraft took off from Agropastoril Bom Pastor Aerodrome - MT (SDWC) to conduct a local instruction flight with an instructor and a student on board.

When, at the final approach to landing, during a simulated engine-out training maneuver to runway 25, the aircraft was observed moving to the right of the runway axis.

On the right side, in the middle portion of the runway, a reversal left curve with a high bank angle was commanded. There was loss of control of the aircraft in flight and consequent collision against the ground.



Figure 1- Overview of PR-DMT.

The aircraft suffered substantial damage.

The two crewmembers suffered fatal injuries.

1.2 Injuries to persons.

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

1.3 Damage to the aircraft.

The aircraft had substantial damage to the engine and its entire structure (Figure 2).



Figure 2 - Damage to the engine and cabin of the aircraft.

1.4 Other damage.

Nil.

1.5 Personnel information.

1.5.1 Crew's flight experience.

	Hours Flown	
	Instructor	Student
Total	Unknown	10:00
Total in the last 30 days	25:00	10:00
Total in the last 24 hours	04:00	02:00
In this type of aircraft	Unknown	10:00
In this type in the last 30 days	25:00	10:00
In this type in the last 24 hours	04:00	02:00

N.B.: The Data on the instructor's flown hours were obtained from existing records in an Excel table organized by the instructor.

The Data on the student's flown hours were obtained from third parties' statements.

1.5.2 Personnel training.

The instructor took the Private Pilot Course – Airplane (PPR), in 2012.

The student performed the eleventh mission of the pre-solo phase of the training program on the aircraft.

1.5.3 Category of licenses and validity of certificates.

The instructor had the Commercial Pilot License – Airplane (PCM) and had valid MNTE, IFRA and INVA Ratings.

1.5.4 Qualification and flight experience.

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

1.5.5 Validity of medical certificate.

The pilots had valid Aeronautical Medical Certificates (CMA).

1.6 Aircraft information.

The aircraft, serial number 15068677, was manufactured by Cessna Aircraft, in 1968 and it was registered in the TPP category.

The Certificate of Entire Content issued by the National Civil Aviation Agency (ANAC) recorded that the PR-DMT, in 03JUL2015, ceased operating in the Private - Instruction category (PRI) and began to operate in the TPP category.

The aircraft had valid Certificate of Airworthiness (CA).

The airframe, engine and propeller logbook records were not updated.

There were several parallel controls of flight hours (Excel spreadsheets) and maintenance control of the aircraft that were in the possession of the Instructor.

The last inspection of the aircraft, the IAM type, was performed on 11MAY2015, by the Aerorural shop, Campo Grande - MS.

A mechanic authorized by ANAC performed the last overhaul of the aircraft, the 50 hours type, on 31AUG2015.

1.7 Meteorological information.

Nil.

1.8 Aids to navigation.

Nil.

1.9 Communications.

Nil.

1.10 Aerodrome information.

The Aerodrome was private, and operated under visual flight rules (VFR) at daytime.

The runway was made of asphalt, with thresholds 07/25, dimensions of 925m x 18m, with elevation of 1033 feet.

1.11 Flight recorders.

Neither required nor installed.

1.12 Wreckage and impact information.

The aircraft crashed into the ground, in a practically vertical trajectory and with an angle of approximately 270° out of the direction of flight.

1.13 Medical and pathological information.

1.13.1 Medical aspects.

Not Investigated.

1.13.2 Ergonomic information.

Nil.

1.13.3 Psychological aspects.

According to the data obtained, the instructor was considered by the family and students as a calm and easy person to relate to others. In situations of conflict, he sought to avoid confrontation.

He was described as a responsible and committed professional, with a careful profile in the preparation of theoretical and practical instructions, being cautious and demanding as to the fulfillment of what was predicted.

However, it was found that, eventually, the instruction did not faithfully follow the planning existing in the material used as the basis of the instructional program.

He was motivated by the instructional activity and had plans to move forward in his professional career.

The instructor was described as a helpful person who had the habit of praising the performance of the students in a group. Often, students would come to him to talk out of the school hours. He stayed at school after the end of the evening theoretical classes to attend them.

The instructor had been in school for about seven months, this being his first job in aviation. He was responsible for theoretical and practical instructions, as well as developing some administrative activities.

During the time he worked at the school, the instructor resided in the facilities provided on-site, which facilitated this informal contact with the students.

According to the information obtained, the student was an extroverted person, being the most communicative in the classroom. He showed a lot of commitment in his training and was motivated by the course, because he had the objective of practicing aviation professionally.

It was reported that the student performed well in flight, and received the instructor's compliments on his proficiency and development in the flight phases.

He showed good performance in the instructions, for example, his first landing on the command of the aircraft was with approximately 5 hours of flight, when the expected to perform such a maneuver was with 7 hours of flight.

The student also worked at the school as an employee, assisting in administrative activities.

According to the information obtained, both the student and the instructor had a good interpersonal relationship with the other students. Besides the joint work and the instructions, both maintained a relation of friendship.

According to reports, the instructor was very competent in his work, having gained the confidence of the school owner and the aircraft's operator to manage and conduct the activities in the school, both administratively and operationally.

1.14 Fire.

There was no fire.

1.15 Survival aspects.

There were no survivors.

1.16 Tests and research.

There was the opening of the O-200-A Continental engine that had been installed in the PR-DMT to analyze its components.

The IAE issued an investigation report in which it concluded that:

The engine that equipped the aircraft was operational and showed evidence that it was in low rotation, probably idle, at the moment the aircraft collided against the ground. Due to the fact that no mechanical fault was detected in the engine analysis, the possibility of pilot-controlled action for "idle" should be considered in this case.

1.17 Organizational and management information.

According to the flight control spreadsheets found on the instructor's computer, the employee, in addition to performing administrative duties at Perfect Flight Aviation School,

gave air instruction from 06:00 until late afternoon. In the evening, the instructor taught theoretical classes between 19:00 and 22:00.

Occasionally, however, the school owner also gave some instructions.

The instructor also exercised management of the aircraft, including maintenance, supply and profitability control, and such information was reported to the aircraft operator.

In the school, the formal evaluation was carried out only in relation to the theoretical part, since it did not have an evaluation system that registered the evolution of the individual performance of the students, with respect to the practical part of the instruction.

There was also no evaluation of the instructor's performance as well as the follow-up on standardization of instruction and the sequence of practical lessons.

The flight schedule was irregular and controlled by the instructor himself, who made the scheduling with the students. In general, he scheduled the flights sequentially. Last week, he had performed three flights in the morning, on a continuous schedule, with no specific interval for briefing and debriefing.

According to the data obtained, the instruction that originated the occurrence was characterized as an informal work activity of the instructor, resulting from an agreement signed between instructor and student.

1.18 Operational information.

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

The student performed the eleventh mission of the pre-solo phase on the aircraft.

The aircraft, probably with the student in command, performed a simulated engine-out training at the end of the procedure.

An observer on the ground reported that the aircraft did not develop a stabilized approach in the final landing.

The ramp in the final was considered high to attempt landing in a simulated engine-out training. In this sense, the aircraft was diverted to the right of the runway axis and, upon reaching halfway through the runway; a closed left turn was commanded, followed by loss of control in flight and consequent collision against the ground.

1.19 Additional information.

There was a contract in a notary's office, signed between the aviation school and the aircraft operator, prevising for the lease of the PR-DMT by the school for instructional purposes.

However, the formalization of the lease was not fully homologated by ANAC, although there was documentation proving that there was an inspection on the aircraft by the Agency. This inspection was configured in one of several steps for leasing homologation.

The school had a register with ANAC to teach theoretical courses aimed at obtaining a Private (PPR) and a Commercial Pilot (PCM) Licenses and a Flight Instrument Rating (IFRA).

1.20 Useful or effective investigation techniques.

Nil.

2. ANALYSIS.

The aircraft performed a local instruction flight, which included simulated engine-out training, with landing performed at the end of the procedure.

According to the report produced by the IAE, the engine that equipped the aircraft was operational and showed evidence that it was in low rotation, probably idle, the moment the aircraft crashed into the ground.

The pilot instructor worked for the aviation school.

The instructor, in addition to performing administrative activities, provided air instruction. Such activities required a great deal of involvement throughout the day, since, in general, the practical classes took place in the morning and the theoretical ones took place during the night. Because he was the only pilot in the school, he centralized all the practical instructions.

Spreadsheets prepared by the instructor recorded air instruction from 06:00 a.m. until late afternoon and evening theoretical classes between 07:00 p.m. and 10:00 p.m.

The workload and the accumulation of functions attributed to him may have interfered with his level of alert, making it difficult to identify the unsafe conditions present in the instruction given.

The student was performing his eleventh pre-solo phase mission at Agropastoril Bom Pastor Aerodrome. The student also worked at the school as an employee, assisting in administrative activities. In this way, according to the information obtained during the investigation, he had other involvements throughout the day, in addition to attending classes at night.

There was a contract signed in a notary's office between the aviation school and the aircraft operator, prevising for the lease of the PR-DMT for instruction. However, the aircraft was registered in the Private Air Services category (TPP).

The alteration of the registry for the Private - Instruction Category (PRI) had not yet been formalized, despite the existence of documentation proving that there was an inspection on the aircraft by ANAC.

In this context, the school was not authorized to give air instruction classes. However, theoretical courses to obtain a Private Pilot License (PPR), Commercial Pilot License (PCM) and Flight Instrument Rating (IFRA) could be offered to students.

The informality of the organizational processes made it difficult to supervise the planning and execution of the operational activities of the school. In this context, there was no formal system for monitoring and evaluating the practical performance of instructors and students, seeking to identify the weaknesses and improve them.

In the case of the flight in question, one of the exercises to be performed would be the landing, following the execution of a simulated engine-out, initiated from the wind leg of the traffic circuit.

The approach maneuver, simulating an engine-out, was in specific regulation for pilot training.

An observer on the ground reported that the aircraft developed a high ramp in the final landing.

The fact that the aircraft has not fulfilled an approach path, considered ideal for landing under such circumstances, can be considered an acceptable fault during the pre-solo phase.

However, the go-around procedure was the most effective alternative, since the landing attempt, due to a non-stabilized approach, would result in the impossibility of landing safely.

According to the ANAC, stabilized approach is:

Approach effected in a controlled and appropriate manner in terms of configuration, power and flight path from a predetermined altitude up to 50 feet above the threshold or the point where the flare maneuver is initiated.

This concept is a general rule in aviation, and should be emphasized in the students' training.

The frustrated attempt to land, even with the possibility of a go-around procedure, contradicted this concept, which denoted a lack of aspects related to the operation of the aircraft and the management of the tasks that affect each crewmember.

Apparently, when it was found the impossibility to land on the previously selected runway, a decision was made to attempt landing from the opposite threshold.

At that moment, the aircraft moved to the right of the runway axis. However, the time to attempt the maneuver proved to be insufficient. From this point on, in the last effort to reach the runway, a high bank angle turn was taken to the left, at low altitude and low power (low gear).

In this context, the combination of low speed, high bank angle and reduced power (low gear) caused the aircraft to lose lift (stall) and spin. After the beginning of the left turn, the pilots lost control of the aircraft, which made a 270° turn until the collision against the ground, which occurred practically in the vertical.

Regarding performance in the practical instruction, it was reported that the student showed good progress in the instruction, and even received praises from the instructor for his proficiency and fast development in the flight phases.

This satisfactory performance, coupled with a good interpersonal relationship kept in the work environment, may have generated an instructor complacency regarding the maneuvers performed by the student on this flight, which were not suitable for safe landing.

This context of confidence in the student's ability may also have made it difficult to identify that the landing parameters (speed, engine power, and wing inclination) contributed to the aircraft's loss of lift.

In addition, it is possible that the decision to continue landing and not performing a go-around procedure in the final, after an unstabilized approach, was due to weaknesses in the training process, that is, the student did not yet have adequate technical knowledge to ensure a better alternative of action for the situation.

3. CONCLUSIONS.

3.1 Facts.

- a) the pilots had valid Aeronautical Medical Certificates (CMA);
- b) the pilot had valid Technical Qualification of MNTE, IFRA and INVA;
- c) the student performed the eleventh mission of the pre-solo phase;
- d) the instructor was qualified and had experience in that kind of flight;
- e) the aircraft had valid Airworthiness Certificate (CA);
- f) the aircraft was within the limits of weight and balance;
- g) the airframe, engines and propeller logbook records were not updated;
- h) the aircraft was registered in the Private Air Services Category (TPP), but was conducting an instruction flight;

- i) there was a leasing contract, registered in the notary's office, between the operator and the aviation school;
- j) the school did not have a register with the ANAC to give practical instruction;
- k) the instructor kept parallel controls of flight hours and aircraft maintenance;
- l) the engine that equipped the aircraft was operational and showed evidence that it was idle, when it crashed into the ground;
- m) there was no follow-up of the student performance in practical flying lessons;
- n) the pilots were conducting simulated engine-out training;
- o) the approach ramp was considered high to attempt landing in a simulated engine-out training;
- p) the aircraft has reached the touch point in an altitude above the expected one, being displaced to the right of the runway axis;
- q) in the attempt to reach the runway, it was performed a large sloping curve on the left, at low altitude and without power (low gear);
- r) the aircraft made a 270° turn and collided against the ground practically in the vertical;
- s) the aircraft had substantial damage; and
- t) the instructor and the student suffered fatal injuries.

3.2 Contributing factors.

- **Handling of aircraft flight controls - a contributor.**

The performance of a high bank angle at low altitude and low power caused the aircraft to lose lift, resulting in loss of control and consequent collision with the ground.

- **Attitude - undetermined.**

Given the friendship between the pilot and the student, as well as the outstanding performance of the student in the school, it is possible that the instructor has adopted a complacent attitude in the instruction.

- **Cabin Coordination - a contributor.**

The landing attempt, after an unstabilized approach, denoted a failure in the aspects related to the management of the tasks that are destined to each crewmember.

- **Training - undetermined.**

The concepts related to the stabilized and aerodynamic approach of aircraft are no longer applied during the execution of the final flight maneuvers, which may be a reflection of the training process, which did not subsidize the student with the necessary knowledge for operational performance in the circumstances encountered in flight.

- **Instruction - a contributor.**

The participation of this factor is related to the deficiency in the application of the fundamental knowledge and other technical conditions necessary for the safe performance of the aerial activity.

- **Piloting judgment - a contributor.**

Upon failing to correctly identify the unsafe conditions resulting from an attempt to land after an unstable approach, there was an inadequate assessment of aspects related to the operation of the aircraft.

- **Work organization - undetermined.**

The workload and the accumulation of functions by the instructor may have contributed to decrease their level of alert, making it difficult to identify the unsafe conditions present in the student's operation.

- **Perception - undetermined.**

The instructor may have developed an expectation and credited safety in relation to the student's performance to the point that he did not identify that the signs provoked by the combination of low speed, low power in the engine and excessive bank angle would culminate in the loss of lift.

- **Insufficient pilot's experience - undetermined.**

The student, who was possibly in command, did not have enough experience to perceive evidence that the aircraft was entering a stall situation.

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

The decision to continue to land and not to perform a go-around procedure in the final, after an unstabilized approach, proved to be a consequence of the dysfunctions of the training process, that is, there was no adequate technical knowledge to ensure a better alternative of action to the situation.

- **Organizational processes - a contributor.**

The school did not have a formal system that could be used to monitor and evaluate the practical performance of the instructors and students, in order to identify possible weaknesses and difficulties, aiming at improving the sensitive points found in the teaching-learning process.

- **Managerial oversight - a contributor.**

There was inadequate oversight of planning and operational implementation activities, as there was no follow-up to the activities performed by the instructor in both the operational and the administrative scope.

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:

Nil.

5. CORRECTIVE OR PREVENTATIVE ACTION ALREADY TAKEN.

On the date of this Final Report's publication, the Perfect Flight Aviation School did not have any courses registered with ANAC and did not operate any aircraft.

On May 10th, 2018.

