

**COMMAND OF AERONAUTICS**  
**AERONAUTICAL ACCIDENT INVESTIGATION AND**  
**PREVENTION CENTER**



**FINAL REPORT**  
**A - 070/CENIPA/2012**

<b><u>OCCURRENCE:</u></b>	<b>ACCIDENT</b>
<b><u>AIRCRAFT:</u></b>	<b>N313PC</b>
<b><u>MODEL:</u></b>	<b>PA-42-1000</b>
<b><u>DATE:</u></b>	<b>20 MAY 2010</b>



## 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 20 May 2010 accident with the PA-42-1000 aircraft, American registration N313PC. The accident was classified as “loss of control on the ground”.

At landing, after the pilot applied the engine reversers, the aircraft made an abrupt yaw to the right, and exited the runway via the right side in an uncontrolled manner.

The pilot and the copilot got out uninjured.

The aircraft was substantially damaged.

No accredited representatives were designated for participation in the investigation.

**GLOSSARY OF TECHNICAL TERMS AND ABBREVIATIONS**

ANAC	National Civil Aviation Agency
ATS	Air Traffic Services
CA	Airworthiness Certificate
CCF	Aeronautical Medical Certificate
CENIPA	Aeronautical Accident Investigation and Prevention Center
CFR	Code of Federal Regulations
CHT	Technical Qualification Certificate
CG	Center of Gravity
DAESP	State of <i>São Paulo</i> Airports Department
FAA	Federal Aviation Administration
FL	Flight Level
IAM	Annual Maintenance Inspection
IFRA	IFR rating (airplane category)
LAT	Latitude
LONG	Longitude
MLTE	AMEL (Airplane, Multi-Engine, Land)
PCM	Commercial Pilot (airplane category)
PPR	Private Pilot (airplane category)
RBAC	Brazilian Civil Aviation Regulation
RBHA	Brazilian Aeronautical Homologation Regulation
RSV	Safety Recommendation
SBJD	ICAO location designator – <i>Jundiaí</i> Aerodrome
SERIPA	Regional Aeronautical Accident Investigation and Prevention Service
SHP	Shaft horsepower
SIPAER	Aeronautical Accident Investigation and Prevention System
SSXX	ICAO location designator – <i>Xanxerê</i> Aerodrome
TSN	Time Since New
TWR-JD	<i>Jundiaí</i> Aerodrome Control Tower
UTC	Universal Time Coordinated
VFR	Visual Flight Rules

<b>AIRCRAFT</b>	<b>Model:</b> PA-42-1000 <b>Registration:</b> N313PC <b>Manufacturer:</b> PIPER	<b>Operator:</b> Aircraft Guaranty Corp
<b>OCCURRENCE</b>	<b>Date/time:</b> 20 MAY 2010 / 19:35 UTC <b>Location:</b> Jundiá Aerodrome (SBJD) <b>Municipality – State:</b> Jundiá – SP	<b>Type:</b> Loss of control on the ground

## 1 FACTUAL INFORMATION

### 1.1 History of the occurrence

The aircraft departed from SSXX at 17:30 UTC, destined for SBJD, with only the 2-member crew on board.

On the descent for SBJD, the crew noticed a stiffening of the left engine power lever movement. The power lever got blocked between 40% and 50% of maximum power.

The crew, in coordination with the SBJD Control Tower, declared emergency and continued descending.

The aircraft was about to join the final leg, when the power lever resumed normal operation, and the crew proceeded for landing. When the reversers were activated at the touchdown, the aircraft made an abrupt yaw to the right and exited the runway.

### 1.2 Injuries to persons

Injuries	Crew	Passengers	Third parties
Fatal	-	-	-
Serious	-	-	-
Minor	-	-	-
Uninjured	2	-	-

### 1.3 Damage to the aircraft

The aircraft sustained substantial damage.

### 1.4 Other damage

Nil.

### 1.5 Information on the personnel involved

#### 1.5.1 Information on the crew

HOURS FLOWN		
	PILOT	COPILOT
Total	4,850:00	2,350:50
Total in the last 30 days	09:00	09:00
Total in the last 24 hours	01:30	01:30
In this type of aircraft	84:50	84:50
In this type in the last 30 days	09:00	09:00
In this type in the last 24 hours	01:30	01:30

N.B.: Data provided by the pilots.

#### 1.5.1.1 Professional formation

The pilot did his Private Pilot course (airplane category) at the *Aeroclube de Pelotas*, State of Rio Grande do Sul, in 1991.

The copilot did his Private Pilot course (airplane category) at the *Aeroclube do Brasil*, State of Rio de Janeiro, in 1986.

#### **1.5.1.2 Validity and category of licenses and certificates**

The pilot presented a Private Pilot Technical Qualification Certificate issued on 13 November 2009 by the Federal Aviation Administration (FAA) in accordance with the 14 CFR Part 91.

He also had a Commercial Pilot license (airplane category), and his AMEL qualification and IFR rating were valid.

The copilot had a valid Technical Qualification Certificate issued by the FAA on 13 November 2009 in accordance with the 14 CFR 91.

He had a Commercial Pilot license, as well as a valid AMEL qualification and IFR rating.

#### **1.5.1.3 Qualification and flight experience**

The pilots had qualification and enough experience for the type of flight in question.

#### **1.5.1.4 Validity of medical certificate**

The pilots had valid Aeronautical Medical Certificates (CCF).

### **1.6 Aircraft information**

The aircraft (SN 425527044) was manufactured by PIPER in 1995.

The aircraft airworthiness certificate (CA) was valid.

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

The last aircraft inspection ("Annual Maintenance Inspection" type) was done by Cheyenne Air Service workshop on 15 October 2009. After this inspection, the aircraft flew 88 hours.

The engines had a total 4,354 hours of operation (TSN), and were 150 hours short of the next overhaul.

### **1.7 Meteorological information**

The prevailing weather conditions were favorable for the type of flight.

### **1.8 Aids to navigation**

Nil.

### **1.9 Communications**

Nil.

### **1.10 Aerodrome information**

SBJD is a public aerodrome under the administration of DAESP (State of São Paulo Airports Department). It operated day- and night-time VFR.

The runway is paved with asphalt, thresholds 18/36, measuring 1,400m x 30m, at an elevation of 2,484ft.

### **1.11 Flight recorders**

Neither required nor installed.

## **1.12 Impact and wreckage information**

The wreckage remained concentrated. The impact affected mainly the front part of the aircraft and the engines, after the aircraft fell in a ravine.

## **1.13 Medical and pathological information**

### **1.13.1 Medical aspects**

Nil.

### **1.13.2 Ergonomic information**

Nil.

### **1.13.3 Psychological aspects**

Not investigated.

#### **1.13.3.1 Individual information**

Nil.

#### **1.13.3.2 Psychosocial information**

Nil.

#### **1.13.3.3 Organizational information**

Nil.

## **1.14 Fire**

There was no fire.

## **1.15 Survival aspects**

Nil.

## **1.16 Tests and research**

During the disassembly of the control cable (teleflex) of the left engine power lever, a rupture was observed in one of its semi-parts.

In the inspection of the right engine propeller assembly, the investigation commission observed that it was indicating a reverse thrust setting.

In the inspection of the left engine propeller assembly, it was observed that it had not been set to reverse thrust.

## **1.17 Organizational and management information**

The crew (of Brazilian nationality) was operating the American registered aircraft under 14 CFR Part 91. The aircraft belonged to Aircraft Guaranty Corp.

## **1.18 Operational information**

The aircraft was on a ferry flight for purposes of receiving maintenance services.

The crew took off from Xanxerê (SSXX) at 1730 UTC, destined for Jundiaí (SBJD).

The weather conditions were favorable for the flight.

Before departing from Xanxerê, the crew performed the prescribed procedures in accordance with the aircraft checklist.

After starting up the engines, the crew performed all the prescribed checks, and no abnormalities were found.



The check of the engines and propellers was performed with the release of the start locks. The crew also checked the movement of the levers with regard to the phases of operation of the engines and propellers (Beta and Reverse).

The taxi, takeoff, climb to FL 270, and level off procedures were uneventful.

Upon starting the descent procedure, the copilot noticed that a stiffening of the power lever movement, which would not allow the power to be reduced below 40%.

Even so, the crew decided to proceed with the descent, since all the engine parameters were normal.

Still during the descent, the crew decided to shut down the engines just after touching down on the runway.

In coordination with SBJD Control Tower, the crew declared emergency as a precautionary measure, and made an approach to runway 18, which had no obstacles along the approach trajectory.

The aircraft was configured for landing and, after a few more attempts to move the lever, it got unlocked, and the pilot were able to select the power required for the configuration.

On the final approach, the aircraft was configured with extended flaps (30°), landing gear down and locked, at a speed of 115kt.

While the aircraft was approaching the runway, the copilot performed the last checks before landing, and set the propellers to minimum pitch, and kept the levers adjusted for maintaining the final approach speed.

At the pre-landing briefing, the pilot informed the copilot that at the moment of touchdown he would shut down the engine right away.

After crossing the runway threshold, the pilot reduced the levers to the *ground idle* position. Upon touching down on the runway at a speed of about 90kt, the copilot requested reverse thrust.

At the beginning of the reverse thrust procedure, the aircraft veered off the runway centerline to the right. The pilot, in an attempt to regain control of the aircraft, depressed the brakes and commanded the pedal to the left, aiming to maintain the aircraft aligned with the runway.

However, the attempt was not successful and the aircraft ended up colliding with obstacles located to the right of the runway.

Each engine was developing a power of 1,000 SHP. If there is torque asymmetry during the application of the reversers, the pilot will find it difficult to maintain control of the aircraft aligned with the runway center line.

The pilots stated that this type of problem had already occurred in another flight on 10 May 2010, when they managed, after a few attempts, to move the power levers without any further problems.

The crew had scheduled the verification of the problem for the next overhaul, thinking that it might have occurred on account of a lack of lubrication of the power control levers.

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

### 1.19 Additional information

At the Initial Action after the accident, the go-team observed the presence of termite-hills on the sides of the runway, close to the lighting pylons.

### 1.20 Utilization of other investigation techniques

Nil.

## 2 ANALYSIS

During the descent, the crew had planned to shut down the engines just after the aircraft touched down on the runway, but the copilot, on account of a probable conditioned reflex, requested reverse thrust after the touchdown.

The pilot, probably on account of a conditioned reflex, applied the reversers right away and, it must have been at that very moment, possibly due to the effort sustained, that the activation rod of the power lever got broken.

After the left engine power lever activation rod got broken, it gave rise to condition of asymmetry, which was not understood promptly by the pilot.

The pilot, not understanding what was going on, held the power levers at full rear position (reverser), in an attempt to control the aircraft with asymmetric application of the brakes and pedals.

In order to maintain the aircraft on the runway, the pilot should have moved the right engine power lever to the ground idle position, aiming at cancelling the asymmetry.

It was not possible to determine neither the reason for the stiffening of the power lever nor the reason for the breakage of the activation rod. If one considers that the next overhaul would take place in approximately 150 flight hours, it is possible that the breakage was a result of fatigue of the material.

## 3 CONCLUSIONS

### 3.1 Facts

- a) the pilots had valid aeronautical medical certificates (CCF);
- b) the pilot had valid technical qualification certificates (CHT);
- c) the pilot had qualification and enough experience for the flight in question;
- d) The aircraft had a valid airworthiness certificate (CA);
- e) The aircraft was within the weight and balance limits;
- f) The aircraft was on a ferry flight aimed at the receipt of maintenance services;
- g) The aircraft took off from SSXX, destined for SBJD;
- h) Upon starting the descent procedure, the copilot noticed the stiffening of the left engine power lever, which would not permit the power to be reduced below 40%;
- i) The crew proceeded with the descent, since all the engine parameters were normal;
- j) Still during the descent, the crew decided that the engines would be shut down just after touching down on the runway;

k) In coordination with the SBJD Control Tower, the crew declared emergency as a precautionary measure;

l) The aircraft was configured for landing, and after a few attempts, the power lever got unlocked;

m) At the before-landing briefing, the pilot informed the copilot that he would shut down the engines just after touchdown ;

n) When the aircraft touched down on the runway, the copilot requested reverse thrust ;

o) Upon application of the reverse thrust, the aircraft, the aircraft veered off to the right;

p) The pilot, in an attempt to control the aircraft, applied the brakes, and commanded the pedal to the left, trying to keep alignment with the runway.

q) The pilot did not manage to take the aircraft back to the runway centerline, and ended up colliding with the obstacle on the right side of the runway;

r) The aircraft sustained substantial damage; and

s) The pilots got out uninjured.

## **3.2 Contributing factors**

### **3.2.1 Human Factor**

#### **3.2.1.1 Medical aspect**

Not investigated.

#### **3.2.1.2 Psychological aspect**

##### **3.2.1.2.1 Individual information**

Not investigated.

##### **3.2.1.2.2 Psychosocial information**

Not investigated.

##### **3.2.1.2.3 Organizational information**

Not a contributor.

### **3.2.1.3 Operational Aspect**

#### **3.2.1.3.1 Concerning the operation of the aircraft**

##### **a) Application of controls – a contributor**

The crew kept the reversers applied in a condition of asymmetry, trying to control the aircraft by means of the brakes and pedals, something that contributed to the aircraft exiting the runway.

##### **b) Cockpit coordination – a contributor**

During the descent briefing, the crew defined that the engines would be shut down just after touchdown, but upon touching down, on account of a probable conditioned reflex, the copilot requested application of reverse thrust, and the pilot applied the reversers;

This fact indicates confusion in the communication between the crew members, leading them to not comply with the procedures established during the briefing;

**c) Pilot's forgetfulness – undetermined**

The crew may have forgotten the decision made at the descent briefing, in which they established that the engines would be shut down after touchdown;

**d) Piloting judgment – undetermined**

The pilots considered that the problem of the stiffened lever was due to lack of lubrication of the control cables, and programmed a verification at the next overhaul, without anticipating the possibility of breakage;

**e) Aircraft maintenance – undetermined**

It was not possible to determine whether there was failure on the part of maintenance in earlier inspections, not allowing detection of the real condition of the power lever control cable.

**3.2.1.3.2 Concerning the ATS units**

Not a contributor.

**3.2.3 Material Factor**

**3.2.3.1 Concerning the aircraft**

**a) Other – undetermined.**

It was not possible to determine whether there was a premature failure of the power lever control cable, or a failure on account of maintenance deficiency.

**3.2.2.2 Concerning ATS equipment and technology systems**

Not a contributor.

**4 SAFETY RECOMMENDATIONS**

*Safety Recommendation is a measure of preventative or corrective nature issued by the SIPAER Investigation Authority (or by a SIPAER-link) within their respective area of responsibility, aiming at suppressing a hazard or mitigating a risk generated by a latent condition, or an active failure.*

*From the SIPAER standpoint, a safety recommendation is essential for Operational Safety, refers to a specific hazard, and has to be complied with within a certain deadline.*

**Safety Recommendation made by SERIPA IV:**

**To SERIPA IV:**

**RSV (A) 184 / 2010 – SERIPA IV**

**Issued on 09/AUG/2010**

1) Publicize the content of this report to the workshops within the area of jurisdiction, as well as at seminars, lectures, and like activities.

**Safety Recommendations made by the CENIPA:**

**To the National Civil Aviation Agency:**

**RSV (A) 254 / 2012 - CENIPA**

**Issued on 03/JULY/2012**

1) Publicize the content of this report to the operators of PA-42-1000 aircraft being flown in Brazil.

**RSV (A) 255 / 2012 - CENIPA**

**Issued on 03/JULY/2012**

2) Evaluate the need to establish additional inspections of the teleflex cables used to control the propeller and power, in view of the occurrence of rupture of the aforementioned cables as informed in the Service Difficulty Reports.

**RSV (A) 256 / 2012 - CENIPA**

**Issued on 03/JULY/2012**

3) Instruct the operators ruled by the RBAC 135, as well as the pilots operating in accordance with the RBHA 91, to emphasize, in the training delivered to the pilots, the importance of adopting a conservative posture for the benefit of flight safety in case of occurrence of technical problems, by evaluating the hazard condition and associated risk, so that the aircraft is, whenever possible, flown to aerodromes with an infrastructure compatible with the severity of the emergency situation.

**RSV (A) 257 / 2012 - CENIPA**

**Issued on 03/JULY/2012**

4) Determine that DAESP take the necessary action to remove the termite-hills from the vicinity of the Jundiaí aerodrome runway, as well as the ditches formed by rainwater erosion, aimed at mitigating the risks and suppressing the existing hazard.

**To the Federal Aviation Administration (FAA):**

**RSV (A) 258 / 2012 - CENIPA**

**issued on 03/JULY/2012**

Publicize the lessons learned from this investigation to PA-42-1000 aircraft operators.

**5 CORRECTIVE OR PREVENTATIVE ACTION ALREADY TAKEN.**

The person responsible for the administration of Jundiaí Aerodrome was verbally instructed by the investigator in charge to remove, in the shortest possible time period, the termite-hills and rainwater-generated erosion ditches from the side of the runway.

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On 03/July/2012.