



AIRCRAFT INCIDENT REPORT

Piper Cherokee PA32

Registration – N87619

Near to Arau Airstrip Region No. 7 Guyana

06 20 00N, 061 04 20W

18th March, 2014

REPORT # GCAA: 2/5/1/74

This report represents the conclusions reached by the Guyana Civil Aviation Authority Accident Investigation Team into the circumstances surrounding the aircraft incident involving Piper Cherokee, PA32 Registration – N87619 near to Arau Airstrip Region No. 7, Guyana on 18th March 2014.

This investigation was done in accordance with Annex 13 to the Convention on International Civil Aviation. The investigation is intended neither to apportion blame, nor to assess individual or collective liability. Its sole objective is to draw lessons from the occurrence which may help to prevent future accidents.

Consequently, the use of this report for any purpose other than for the prevention of future accidents could lead to erroneous conclusions.



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Synopsis

On 18th March, 2014 at 15.14hrs UTC, the Georgetown Area Control Center (ACC) received a call from Mr. Bernard Singh, a private aircraft operator who reported, via satellite phone, that his aircraft N87619, a Piper Cherokee, had crashed after departure from Arau Airstrip (SYAU). He reported that three other persons and himself, who were on board were injured. The aircraft crashed approximately three to four minutes after takeoff, at position 06 20 00N, 061 04 20W, elevation 2851ft.

The accident was notified to:-

The State of Manufacture/Registry	-	Federal Aviation Administration, USA
	-	National Transportation Safety Board, USA
Other Agencies	-	International Civil Aviation Organization

Guyana is both the State of Occurrence and the State of the Operator and is the Accident Investigation Authority. The State of Registry is the United States of America. A non-travelling accredited representative was named by the NTSB, USA.



ABBREVIATIONS

ACC	–	Area Control Center
ATC	–	Air Traffic Control
ATS	–	Air Traffic Services
CAVOK	-	Ceiling and visibility Ok
CJIA	–	Cheddi Jagan International Airport
CPL	-	Commercial Pilot Licence
ELT	–	Emergency Locator Transmitter
FAA	–	Federal Aviation Administration (United States of America)
FARs	-	Federal Aviation Regulations
FIC	-	Flight Information Center
GCAA	–	Guyana Civil Aviation Authority
HF	–	High Frequency
GPS	–	Global Positioning System
IA	-	Inspector Approval
ICAO	–	International Civil Aviation Organization
IR	-	Instrument Rating
KHz	-	Kilohertz
MHz	-	Megahertz
NTSB	–	National Transportation Safety Board (United States)
PIC	–	Pilot in Command
RCC	-	Rescue Coordination Center
SAR	-	Search and Rescue
SYGO	-	Ogle International Airport
UTC	–	Coordinated Universal Time
VFR	–	Visual Flight Rules
VHF	–	Very High Frequency



1. FACTUAL INFORMATION

1.1. History of the Flight

The aircraft departed Arau Airstrip at 13:05hrs UTC approximately and crashed about 3-4 minutes after takeoff on the Crubu Mountain, four miles from Arau. The pilot reported that shortly after takeoff, the engine started running rough and he turned the aircraft around in an attempt to get back to Arau Airstrip. He reported that he had 5gls of fuel in the left main tank and 18gls in the right main tank. However he started the aircraft and executed the takeoff with the fuel selector on the left main tank. When he was approximately 900ft above Crubu Mountain, the engine started to run rough. His immediate reaction was to switch tanks. The intention was to switch to the right main tank but in the urgency of the situation, he mistakenly moved the selector past the right main tank to the right wing tip tank which was empty.

He explained that because he was low over the terrain he did not have much time to react. He recalls looking for a clear spot to put down the aircraft, but could not recall much about the crash because he lost consciousness.

The ATS report, which was provided by the pilot, indicated that the aircraft was on its first flight for the day. Fuel endurance was 1 hour 30 minutes and the aircraft was equipped with an ELT.

1.2. Injuries to Persons

Table: 1

Injury	Crew	Passengers	Others	Total
Fatal	0	0	0	0
Serious	0	2	0	2
Minor/None	1	1	0	2
Total	1	3	0	4



1.3. Damage to Aircraft

The aircraft was damaged beyond economic repair. It impacted several small trees before coming to a stop. The entire starboard wing was separated from the fuselage. The right wing tip tank and aileron separated from the wing. The port wing tip fairing was severed.

One of the propeller blades had penetrated the ground. The other blade showed signs of impact with trees and the ground.

1.4. Other Damage

The aircraft cut a swathe where it went through the trees. The area where the aircraft came to rest was ploughed up.

1.5. Personnel Information

Flight Crew

Pilot Licence	US Commercial Pilot Licence #2494077
Aircraft Ratings	Airplane Single & Multi Engine Instrument
Date of Birth	27 th April, 1970
Age	43 years
Type of Medical	US 2 nd Class
Date of Medical Expiry	30 th April, 2014
Total Flying Hours	2,360hrs +

The pilot holds a US CPL. He indicated that he received his training at South Wind Flight Training School where he acquired private IR, single engine IR commercial and multi-engine IR commercial ratings. He did both ground and flight training. He stated that the course was FAA approved. He completed his current US 2nd Class Medical in April, 2013. The limitation on the medical indicates that he needs to wear corrective lenses.



The pilot is a private operator who flew in the USA for about thirteen years before he came to Guyana. During this time he stated that he had acquired about 300hrs flying. This represented approximately 100hrs of recreational flying and about 200hrs of flight training. The record of his flight and duty times from December 2010 to 17th March, 2014 were within acceptable limits.

1.6. Aircraft Information

1.6.1. General

This aircraft is a six-seater, single engine, low wing monoplane of all metal construction.

Manufacturer	Piper Aircraft Corporation
Aircraft Registration	N87619
Type and Model	Piper Cherokee – PA32-6
Year of Manufacture	1970
Serial Number	32-40752
Certificate of Airworthiness	Issued 13 th March, 1975
Total Airframe Time	8744.3hrs approximately
Date of Next Annual Inspection	1 st April 2014
No. and Type of Engines	One – Lycoming TIO-540-SER, 310hp
Engine Serial Number	L-5784-48
Engine TSO	1951.77hrs approximately
Gross Weight	3400lbs
Recommended Fuel	Av Gas 100/130



This aircraft was previously involved in an accident on 16th November 2011. The aircraft was grounded until April 2012, when an engine change was done. At the time of engine change, the record shows that the installed engine had acquired 1574.67hrs since its last major overhaul. Since installation on this aircraft, it acquired approximately 377.1hrs.

ATS advised that flight plans submitted for flights prior to the accident, indicated that the aircraft was equipped with an ELT that transmitted on 121.5MHz. The aircraft was also equipped with a Spot Tracker. The code for accessing information on aircraft movements had been provided to ATS.

1.6.2. Maintenance

The aircraft is based at Cheddi Jagan International Airport (CJIA), Timehri, where its maintenance is done. This aircraft was operated in accordance with the FAA FARs Pt. 91 and therefore does not require an approved maintenance programme. However it is expected that the aircraft would be maintained in accordance with the inspection requirements contained in Section III of the Piper Cherokee Service Manual, which states that each inspection or operation is required at each of the inspection intervals as indicated. An IA Holder who certified the last annual inspection done during March 2013, reported that at the time of inspection there were no outstanding maintenance issues.

1.6.3. Fuel System

This aircraft has a fuel capacity of 84 gallons, which is contained in four fuel tanks. The two main inboard tanks have a capacity of 25gls each and the two tip tanks hold 17gls each. According to the Piper Cherokee 6 Owner's Handbook all the fuel, except for approximately 1pt in each of the four tanks is usable. The tip tanks must be filled first and fuel must be used from the main tanks first. The handbook further states that when using less than the total capacity of 84gls, fuel should be distributed equally between the two sides filling the tip tanks first.



The fuel selector control is located below the center of the instrument panel. It has five positions, four of which correspond to each of the tanks and the fifth is the OFF position. Each position is slotted and clearly marked; 'OFF, LEFT WING TIP, LEFT MAIN, RIGHT MAIN, RIGHT WING TIP'. To select any position it is necessary to ensure correct selection and that the selector is firmly in the correct detente. When the selection is made it stays in position. To go to the 'OFF' position, a knob (safety lever) on the selector has to be depressed. This ensures that you do not go to the 'OFF' position by mistake.

The fuel gauges for each of the four tanks are located in the engine gauge cluster on the left side of the instrument panel. The pilot advised that the fuel gauges were working and corresponded with his visual estimate of the amount of fuel in the aircraft. A fuel pressure indicator is incorporated in the engine instrument gauge cluster.

An electric fuel pump is provided for use in case of failure of the engine driven pump. The electric fuel pump operates from a single switch and independent circuit protector, and should be 'ON' for all takeoffs and landings.

The Handbook provides detailed instructions for fuel use, along with a reminder of some of the more highly recommended fuel operation procedures. Among these reminders are that takeoff must be on the main tank with the most fuel. Fuel tank selection is not recommended at low altitude and the fuel selector should be changed to another tank before fuel in the tank in use is exhausted.

Refueling of this aircraft is normally done by RUBIS International at CJIA, Timehri. RUBIS is an approved aviation fuel provider and only provides aviation fuel directly to the aircraft. The pilot stated that he refuels at RUBIS and siphons the fuel from the aircraft into drums, which he would then transport into the hinterland to provide aircraft fuel for his shuttling operations. On being questioned the pilot stated that the drums used were not approved but he took care to ensure that they were clean and safe for carrying aircraft fuel. Further he recognized that proper sealing of the drums is essential so he changed drums regularly as a means of ensuring that he did not transport aircraft fuel in drums if the seals were damaged. However the pilot never requested and was never given approval to transport dangerous goods.



In the hinterland, the aircraft is refueled using a funnel and filter. The aircraft's average fuel consumption is 15gls per hour.

1.6.4. Passenger accommodation

This aircraft is equipped with six seats positioned in three pairs. The seats are adjustable for ease of entry and exit and are easily removable.

There were three passengers on the flight, but there was only one passenger seat on the aircraft. This was the right No.1 (co-pilot) seat. The other two passengers were seated on the floor at the back of the passenger compartment. The pilot stated that the other seats were left at the base because the last flight from the base was a cargo flight.

1.6.5. Mass and Balance

There is no facility at the point of departure to weigh aircraft load. The aircraft maximum gross weight is 3400lbs. Its empty weight is 1787lbs and the useful load is 1613lbs.

1.7. Meteorological Information

This accident occurred in daylight. There is no weather observation or recording station in the vicinity of the departure aerodrome or the accident site. The pilot reported that at the time of the accident the weather was CAVOK.

1.8. Aids to Navigation

There are no aids to navigation in the area.

1.9. Communications

The frequencies available for communications between the FIC and aircraft are; 124.2MHz, 130.125MHz and 6735.5KHz. The ATS Report indicated that the operational frequency was



124.2MHz. There were no reported malfunctions of the aircraft or FIC communications systems at the time. The pilot did not communicate his departure with the Georgetown Flight Information Center, but he stated that he did broadcast going into position in preparation for takeoff and he did broadcast his departure message. He is unsure if the broadcast messages were heard by anyone as he got no response to them. The accident site investigator's report noted that the VHF rack was empty but there was a VHF radio with the pilot's headset.

The pilot lost consciousness after the accident. When he regained consciousness, he reported the accident to the Georgetown FIC via Satellite phone.

1.10. Aerodrome Information

This was an off aerodrome accident that occurred shortly after takeoff.

1.11. Flight Recorders

The aircraft is not required to be equipped with flight recorders.

1.12. Wreckage Information

1.12.1. Wreckage site

The aircraft crashed in a mountainous area. The top soil was sand with shrubs and tall grass and a scattering of tall slender trees. The first point of impact was made by the starboard wing which struck a tree six feet up. The aircraft came to rest 45ft away.

1.12.2. Damage to the aircraft

The impact between the starboard wing and the tree caused the entire starboard wing to be separated from the fuselage and the right wing tip tank and aileron were sheared from the wing. The port wing tip fairing was severed by impact with another tree.

Both main fuel filler ports were separated from the main fuel tanks.



The nose wheel separated from the nose gear and was found buried in the ground almost 20ft behind the main starboard wheel.

Both the pilot seat and the right No.1 passenger seat were secured in the seat rails, but the no.1 passenger seat back was broken at the attachment point.

One of the propeller blades had penetrated the ground. The other blade showed signs of impact with trees and the ground.

The flight and engine instruments were normal.



1. Picture of the Wreckage



1.13. Medical and Pathological Information

The pilot was subjected to a medical examination after the accident. Tests were done for blood alcohol level and the presence of marijuana and cocaine. The blood alcohol test was normal and the marijuana and cocaine tests were negative.

1.14. Fire

There was no fire.

1.15. Survival Aspects

The pilot stated that he took off from the airstrip at approximately 13.05hrs UTC. About 3–4 minutes after takeoff and at approximately 900ft above the terrain, he stated that the aircraft engine started losing power and running rough. While looking for a suitable landing spot he switched tanks and did the emergency procedures, but he did not have much time because he was not high above the terrain. He also turned the aircraft around in an attempt to get back to the airstrip, but realized that the aircraft could not make it back to the airstrip. He attempted to put down the aircraft in a clearing. The aircraft crashed and he lost consciousness for approximately two hours. He was aroused by one of his passengers who indicated that he needed to tell someone about their location. He subsequently notified his location to the Georgetown FIC by satellite phone.

The FIC activated the RCC and preparations were made to rescue the four injured persons. The crash site was located by another pilot who reported the coordinates to the RCC.

The Guyana Defence Force helicopter reached the crash site approximately two hours after the report was received and approximately four hours after the crash. The injured persons were evacuated from the crash site to Kaikan Airstrip, where they received initial medical treatment. They were then airlifted to Georgetown where they received treatment at the Georgetown Public Hospital.

All persons on board received injuries. The most seriously injured passenger was one of those seated on the floor of the aircraft. He suffered a dislocated right hip and a fractured



left hip. Another passenger suffered a dislocated left hip. The third passenger suffered temporary memory loss. The pilot received bruises to his face.

1.16. Tests and Research

Not applicable.

1.17. Organizational and Management Information

The pilot is a private operator who used the aircraft in support of his mining business. The passengers were his employees and had just finished a two months rotation at his mining operation. They were being transported to Ekereku Bottom to connect with a scheduled air service to Georgetown.

1.18. Other Information

The pilot was given approval to operate his US registered aircraft in Guyana, in a private capacity, by the GCAA. He was approved to operate to Ekereku, Arau and Chi-Chi Airstrips.

Since commencing operations in Guyana in 2007, this pilot had two previous accidents. There were also at least three occasions when he did flights and did not report his movements or did not close his flight plans. These incidents resulted in activation of the RCC and SAR. The pilot was penalized for these incidents.

The pilot stated that since then, although his radio was working, he would ensure that he carries a satellite phone and two hand-held radios. He normally reports closing his flight plans by radio and as a follow-up, on landing he would call the FIC via satellite phone to advise that he is on the ground.

The pilot reported that the day before this accident he had flown from Ekereku Bottom to Arau. This flight was done on the left main tank and the fuel selector remained in this position. His explanation for the large fuel imbalance was that the previous day he started



with 18gls in each tank and flew on the left main tank and the selector was not changed from that position. It should be noted that the pilot's logbook showed that on the previous day, he did one flight lasting for 12 minutes. If his previous statement and his logbook entry are correct, then he would have used 13gls of fuel for a twelve minute flight.

2.0. ANALYSIS

2.1. General

Fuel exhaustion occurs when there is no useable fuel remaining in the tanks to supply the aircraft's engine. Fuel starvation happens when there is adequate fuel on board but the supply to the engine is not maintained. It is generally believed that the more tanks available the more likely it is to choose the wrong tank.¹

The pilot reported that during the pre-flight checks, he visually confirmed that the left main tank had 5gls of fuel and the right main had 18gls. He knew that the fuel selector was on the left main and he had intended to switch it to the right main but he forgot. Both tip tanks had unusable fuel. He then boarded the aircraft and did the "Before Starting Engine check", using the approved checklist. He demonstrated how this was done. When questioned about tank selection he stated that he intended to select the right main tank but did not do so. After further questioning he admitted that he did not use the checklist. The Owner's Handbook states "Takeoff should be made on the fullest main tank to assure best fuel flow, and this tank should be selected before or immediately after starting to allow fuel flow to be established before takeoff."

It was noted that the Owner's Handbook advises use of the main tanks first then the tips. The pilot stated that this is what he did. He was then asked to explain if he had used the mains first, how could there have been 18gls of fuel in the right main, 5gls in the left and both tips were empty. He explained that he intended to switch to the right main tank but did not give an acceptable explanation for not doing so.

¹ ATSB Publication Avoidable Accidents No.5 Publication No.AR2011 112 Dated 25th March, 2013



It was noted that the flight on the previous day was completed using only the left main. He was reminded that both landing and takeoff should be done with the selector on the main tank with the most fuel. If he had switched tanks during that flight then the fuel selector would have been on the right main tank and there would have been less imbalance between tanks.

A fuel sample could not have taken because both main fuel tanks were ruptured and there was no fuel in the fuel system. Inspection of the accident site did not reveal any smell of fuel or show any scarring of the vegetation which would have indicated that 18gls of fuel had drained from the tanks.

The pilot, himself, also said that he did not notice the smell of fuel or observe any charring of the surrounding area when he regained consciousness. It was also noted that there was no urgency among the survivors to remove themselves from near to the wreckage due to fear of fire or explosion.

The pilot said that he was upset with himself because he had fuel at the Arau Airstrip and could have refueled before departure. An inspection of the airstrip and surrounding areas was done by the Accident Investigator and the GCAA Aerodromes Inspector. No fuel container was seen at the airstrip. Also there was no shed or any other facility at the airstrip, where fuel could have been safely stored.

2.2. The Pilot

The several inconsistencies in the pilot's reporting cast doubt on the veracity of several other explanations.

He is on record for flying around Guyana's hinterland on several occasions, without reporting his movements. Being asked, he stated that for the accident flight he did broadcast both taking the active and his departure on Frequency 124.2MHz, however there is no confirmation that either of these broadcasts was heard by anyone. He did not use his satellite phone to advise Air Traffic Services of his planned departure. ATS only became aware of his movement when he called via satellite phone to report the accident.

By his own admission the pilot stated that complacency had stepped in because it was a short flight and he never considered that anything could go wrong.



2.3. The Aircraft

The aircraft was left overnight at the airstrip. The pilot had initially stated that he was satisfied with the safety and security of the aircraft because as was his habit, he had keyed it and no one could have accessed it. However one of the passengers told the investigation team that he and another passenger had slept overnight in the aircraft with the full knowledge and consent of the pilot. The passenger said that he did not touch anything in the aircraft. When questioned about this later, the pilot said that the two passengers did sleep in the aircraft but he did not remember.

When the aircraft left its base on 2nd March, 16 days before the accident radio communications with ATS was satisfactory. The flight on 17th March, the day before the accident, was closed by use of the Satellite phone to the FIC. However with the empty VHF rack it could not be ascertained if the aircraft was properly equipped with the required fixed VHF and HF radios for hinterland operations. Also the pilot had never applied for nor was he given approval to use a satellite phone in place of the required radios.

There was no evidence that the aircraft's ELT activated after the crash as the alarm was not heard by any ATS facility, nor was any such report made. The aircraft was also equipped with a Spot Tracker. The code to access information from the spot tracker had been previously supplied to ATS. However after receiving the accident report a check was made, but no information was available.

2.3.1. Passenger Accommodation

Of the three passengers, only one was accommodated in a seat. The pilot stated that the other seats were left at the base to accommodate cargo. Thus, the required number of seats were not available at the point of departure. The pilot stated that he had tried to persuade the passengers to wait until the next day, but they were anxious to come home. He was reminded that he was the Pilot-in-Command and he has to take responsibility for the safety of his passengers.



2.4. Survival Aspects

The pilot stated that when he taxied into position and when he took off he had broadcast his intentions but was not certain if his broadcasts were heard as he got no response to them. It should also be noted that he did not use his satellite phone to report his movement to ATC. Thus although the pilot was previously penalized for not reporting his movement, he still did not make every effort to ensure that he reported. This gave rise to the concern that if the pilot had not regained consciousness to make the accident report via the satellite phone, then he, his passengers and his aircraft may have been unaccounted for.

Although the pilot switched tanks after the engine started running rough, he did not switch to the tank that he claimed had fuel, but to an empty tank. The Owner's handbook states the following

1. Fuel tank selection at low altitude is not recommended as little recovery time is available in event of an error in tank selection.
2. When switching tanks, make sure that the selector drops into the correct détente, lined up with the desired tank.
3. The electric fuel pump should be turned on before switching tanks and should be left on for a short period thereafter.
4. To preclude making a hasty selection, and to provide continuity of flow, it is desirable that the selector is changed before fuel is exhausted from the tank in use.
5. If signs of fuel starvation occur at any time during flight, fuel exhaustion should be suspected, at which time the fuel selector should be immediately positioned to a full tank and the electric fuel pump switched to the on position.

The pilot did not follow the procedures outlined in the handbook.



3.0. CONCLUSION

3.1. Cause

The probable cause of the accident was fuel exhaustion.

3.2. Contributory Causes

1. The pilot's complacency led to him not ensuring that the aircraft had sufficient fuel for the flight.
2. During the flight previous to the accident flight, the pilot failed to follow the standard procedure that required the landing to be done on the fuller main tank.
3. The pilot failed to carry out the pre-takeoff checks and thereby overlooked the proper selection of the tank with the most fuel.
4. He departed with the fuel selector on the left main tank, which he claimed had 5gls of fuel, instead of the right main which he claimed had 18gls of fuel.

3.3. Findings

1. This accident was avoidable.
2. The pilot was properly qualified for the flight.
3. The pilot by his own admission was complacent and did not ensure that the aircraft had enough fuel for the flight.
4. The pilot did not use the check list for any phase of the flight.
5. The pilot violated GARS 8.5.1.1 (a) which states that the PIC shall be responsible for the safety of the aircraft and all persons on board during flight.
6. The pilot violated GARS 8.5.1.3 regarding negligent or reckless operation of an aircraft.
7. The pilot violated GARS 8.6.1.1(b) – The requirement to submit a flight plan.



8. The pilot violated GARS 8.6.2.14(a) regarding minimum fuel supply for VFR flight.
9. The pilot violated GARS 8.6.2.17(a) regarding aircraft loading and mass and balance.
10. The pilot violated GARS 8.9.1.3(a) & (b) which requires the PIC to ensure that each person on board occupies an approved seat and is secured in his seat by a seat belt.
11. The pilot violated GCARs Paragraph 52 by carrying Dangerous Goods on his aircraft with the necessary approval.

4.0. RECOMMENDATIONS

1. Given this pilot's record of operation in Guyana and the amount of serious violations incurred, the GCAA should review his permit to operate aircraft in Guyana.
2. Pilots need to be reminded to pay more attention to fuel management and must be reminded of the minimum fuel requirements for flight.
3. Pilots must be reminded to adhere to pre-flight procedures and checks to ensure that the correct fuel tank is selected before takeoff and landing.
4. Pilots must be reminded that it is illegal to carry passengers without proper seating accommodation and the necessary restraints.
5. Pilots must be reminded of the need to file flight plans by any available means.
6. Pilots must be reminded of the need to broadcast their intentions to land and takeoff when operating at uncontrolled aerodromes, so that other aircraft operating in the vicinity will be aware of their aircraft movements.
7. Pilots must be reminded to seek approval from the GCAA to carry Dangerous Goods.



5.0.ACTIONS TO BE TAKEN BY GCAA

1. Review pilot's permit to operate in Guyana. Review should include requirement for pilot to fly in the hinterland, with an experienced pilot for one year or 300hrs whichever ever takes longer, before being permitted to operate solo.
2. Instruct pilot to complete at least 20hrs of ground school refresher training with an approved instructor, to achieve the following;
 - a) Complete review of the Pilot Operating Handbook,
 - b) Single pilot crew resource management,
 - c) Aircraft loading and mass and balance,
 - d) Fuel management and minimum fuel requirements.
 - e) Use of checklists in all different phases of flight.
 - f) Pilot responsibilities regarding safety of aircraft and passengers.
 - g) Rules regarding carriage of Dangerous Goods.
 - h) Rules regarding operations at uncontrolled aerodromes.
 - i) Rules regarding filing and closure of flight plans.
3. Consider the development and publication of Aviation Safety Leaflets that contain operational reminders as listed in Section 4.0 above.
4. Arrange to host regular safety seminars for pilots to keep them reminded of operational requirements.