

**MINISTRY OF INFRASTRUCTURE DEVELOPMENT**

**ACCIDENT INVESTIGATION BRANCH**

**CIVIL AIRCRAFT ACCIDENT No. CAV/ACC/ 1/07**

**REPORT ON THE ACCIDENT TO PIPER PA 31-310 AIRCRAFT  
REGISTRATION 5H- MUX WHICH OCCURRED ON 5 JANUARY 2007  
AT MATAMBWE AIRSTRIP, SELOUS GAME RESERVE, TANZANIA**

# Tanzania Accident Investigation Branch

## Ministry of Infrastructure Development

<b>Civil Aircraft Accident No.</b>	<b>CAV/ACC/1/07</b>
<b>Aircraft type:</b>	Piper PA 31-310
<b>Nationality and Reg. Marks:</b>	5H- MUX
<b>Operator:</b>	DJB Ltd P.O. Box 10,000 DAR ES SALAAM Tanzania
<b>Crew:</b>	1- Uninjured
<b>Passengers</b>	1- Killed 2- Seriously injured 7-Minor/Nil injuries
<b>Place of Accident:</b>	Matambwe Airstrip, Selous <b>Latitude</b> S 07 32 08 <b>Longitude</b> E 037 46 39
<b>DATE:</b>	5 January 2007
<b>Time:</b>	0825 hours approximately.

**ALL TIMES UTC**

### **SYNOPSIS**

The aircraft was operating a charter flight to transport a party of 10 tourists from Dar es Salaam to Matambwe, in the Selous Game Reserve. The flight to Matambwe was uneventful. On reaching Matambwe the aircraft circled overhead the airstrip twice before a landing was attempted. 5H-MUX was subsequently observed to touch down on the uphill portion of runway 28 and rolled for about 120 meters at which point the sound of increasing power was heard. The aircraft got momentarily airborne and collided with trees just beyond the end of the runway. A severe fire broke out and the aircraft was completely destroyed. One passenger was killed and two were seriously injured.

The report concludes that the accident was caused by the aircraft colliding with trees just beyond the end of the runway. The failure to select the correct flap position for the take off, the lack of proficiency training, insufficient flight preparation and lack of real time information on the destination airport were contributory factors.

## **1. FACTUAL INFORMATION**

### **1.1 History of the flight**

The aircraft was carrying tourists, including the organizer of the trip to Matambwe. These passengers included five adults, a boy of sixteen, three girls of eleven, five and four years. There was also an infant of 11 months. This trip was arranged by a company called *Tent with a View Safaris*, which owns a camp at Matambwe in the Selous Game Reserve.

According to the company, initially two aircraft were organized to transport the passengers to Matambwe. The booking was made through a telephone call to an operator called Wings of Zanzibar, who advised them to go to Terminal I of Julius Nyerere International Airport in Dar es Salaam. However, when the passengers arrived at the Wings of Zanzibar office at the airport, they found it closed. When Wings of Zanzibar was contacted on the telephone, a pilot employed by another company, DJB Ltd, was alerted to meet them.

The pilot initially took them to the offices of DJB for payment. He also recommended that one aircraft would suffice for the trip. According to the pilot, he believed that the three children were small enough to sit on their parents' laps. The passengers had little baggage.

The aircraft, a Piper PA31-310 Navajo, took off from Dar es Salaam at 0825 hours and cruised at FL 65. The flight to Matambwe was uneventful and the aircraft was overhead the airstrip at 0902 hours.

The pilot over flew the airstrip to alert the camp staff and check for wind and animals, a common procedure for landing in the Game Reserve airstrips. He also made another low run over the runway to ascertain its condition. Eye witnesses and passengers confirmed that the pilot made an overshoot, having flown very low attempting to land. The pilot was not sure of the runway condition because he had not flown into this airfield for a long time. In addition, before embarking on this trip, he had requested information on the runway condition from another pilot who had recently flown into the airstrip. He was told that the runway was usable.

Finally, the pilot decided to land. He chose to land on runway 28 with full flaps. He touched down about two hundred and fifty meters beyond the beginning of the usable part of the runway and braked normally. After rolling for some time, he realized that the aircraft would not be able to stop before the end of the remaining length of the runway. With about another two hundred and fifty meters ahead, the pilot initiated a go round believing he had sufficient runway length remaining to gather enough speed for take off and climb out. He immediately increased power and initiated the go around. It is at this moment that the aircraft became airborne with no speed increase. The aircraft flew straight and level at full power without gaining height. It subsequently started chopping small tree tops for about two hundred meters beyond the end of the runway and then started to lose height. As it did so, the starboard wing collided with a large tree and the aircraft rotated through 180 degrees before coming to rest. The main wreckage settled below the impact tree and the passengers evacuated immediately.

The wreckage caught fire immediately after the last passenger was evacuated. It burned completely, leaving only the tail fin and parts of the engine nacelle. When staff members from *Tent with a View Camp* located at Matambwe arrived, the aircraft was burning fiercely. They assisted in moving the occupants to a safer location, far from the burning wreckage and in administering first aid. The aircraft occupants were later treated at a local dispensary before being transported to a hospital in Dar es Salaam. One passenger died in the hospital four hours after the accident. Two passengers were treated for serious injuries. The injuries to the rest of the occupants were minor.

## 1.2 Injuries to persons

INJURIES	CREW	PASSENGERS	OTHERS
Fatal	-	1	-
Serious	-	2	-
Minor/None	1	7	N/A

## 1.3 Damage to the aircraft

The aircraft was completely destroyed by impact with trees and the subsequent fire.

## 1.4 Other damage

Some trees at the crash site were burnt.

## 1.5 Crew information

The pilot was born on 12 August 1980 at Pemba, Tanzania. He held a Commercial Pilot's License No. HP-577 granted on 13 May 2002 on the strength of his FAA CPL No. 263944 issued on 7 November 2001. He also held a Flight Radio Telephony Operator's License No. H-926 that was kept current in line with his Tanzania CPL. By the time of the accident his license was valid till 6 June 2007.

He was rated to fly the following aircraft in Group I:  
Cessna 172, Cessna 182, Cessna 206.  
Piper PA 31, Piper PA 34.

The pilot had not done his proficiency checks for 17 months.

## 1.6 Aircraft information

The aircraft, a Piper PA31-310 Navajo serial number 31- 627 powered by two Lycoming TIO-540A2B engines was manufactured by the Piper Aircraft Company at Lockhaven, Pennsylvania, USA in 1970. It arrived in Tanzania in June 2003 with a United States Export Certificate of Airworthiness No. E346619 and Registration N88CD. It was registered in the country in the name of Joseph E. Kisaka, P.O. Box 15033 Arusha, Tanzania on 19 June 2003.

A Certificate of Registration No. 443 was issued. A Certificate of Airworthiness No.493 was issued on 8 July 2003 to expire 12 months later. The Certificate of Airworthiness has since been kept current through periodic renewals. By the time of the accident the Certificate of Airworthiness was valid till 13 August 2007. 5H-MUX was operating under DJB Company's Air Operator Certificate.

### **1.6.1 Weight and Balance:**

The aircraft was last weighed on 20 May 2003 and its empty weight was found to be 4130 lb. The fuel in the aircraft tanks was given by the pilot as 320 litres. The passengers were not weighed before boarding the aircraft. The individual weights of the passengers were supplied by one of the passengers. They amounted to 1,269 pounds. The baggage was estimated at 100 kg. The weight of the aircraft at the time of take off from Dar es Salaam was therefore estimated as follows:

Aircraft empty weight	4,130 pounds
Fuel (320 litres)	508
Pilot	172
Passengers	1,269
Baggage (100 kg)	220
<b>Take off weight (estimated)</b>	<b>6,299 pounds.</b>
Maximum allowed take off weight	6,500 pounds

The aircraft had seven seats for passengers and one seat for the pilot.

### **1.7 Meteorological information**

The weather was described as fine and was not a factor in this accident.

### **1.8 Aids to Navigation**

Not applicable

### **1.9 Communications**

Not applicable.

### **1.10 Aerodrome information**

Matambwe airstrip, elevation 500 feet has one runway 10/28 which is 1200 meters long. The airstrip is 93 miles south west of Dar es Salaam. At the time of the accident, the surface of the usable part of the runway was grass with bare soil along tire tracks.

The usable part of the runway was about 700 metres long and had significant down slopes on both ends. The first part of runway 28 was outgrown with grass and was therefore not usable. There were no clear markings to show runway edges. There were temporary repairs done on the runway. Some heaps of earth and broken bricks had been poured at the beginning of the

usable part of runway 28. They were not evenly spread or compacted. This caused the pilot to touch down beyond this area.

### **1.12 Wreckage information**

The aircraft was extensively damaged by the impact with trees and fire except for the tail fin and parts of the engine nacelle. The propeller blades were all bent in the direction of rotation indicating that they were rotating at high power at the time of impact. The flaps were fully extended.

One side of the fuselage appears to have been penetrated by a piece of a tree and this may have caused the fatal and serious injuries among the occupants.

### **1.13 Medical and pathological information**

One passenger sustained fatal injuries. Another passenger was seriously injured with a broken arm and multiple rib fractures. The injuries to rest of the occupants were minor.

### **1.14 Fire**

Fire broke out and consumed much of the wreckage. The vegetation around the crash site was also burnt.

### **1.15 Survival aspects**

Rapid evacuation of the aircraft after the accident appears to have saved the passengers because fire destroyed the aircraft immediately after the last person was extricated from the wreckage.

### **1.16 Tests and Research**

Not applicable

## **2 ANALYSIS**

### **Preparations for the Flight**

The passengers had booked their flight with a company called Wings of Zanzibar and when they arrived at the airport for the trip Matambwe they found the office of this company closed. When the company was contacted by phone a DJB pilot was alerted and he immediately proceeded to meet the passengers.

Wings of Zanzibar did not sub-charter the DJB aircraft to transport their passengers to Matambwe. In fact the flight was handled directly by DJB as evidenced by the fact that the passengers were immediately taken to pay for the flight at the DJB offices. The passengers themselves did not object to the switch of operators.

The company preflight preparations were inadequate. There was no effort made to find the real time information of the condition of the destination airstrip. There had been heavy rains in the country which had damaged many runways. It is the duty of the company operations manager to ensure that current information about destination airfield is available to the pilot before an aircraft is dispatched. At the time of the accident, the company was operating without the services of the operations manager. In fact as is now known the operations manager, who was also the company chief pilot was out of the country and was in the process of leaving the company for another job. The absence of the operations manager was not communicated to the Civil Aviation Authority within 14 days as required by the regulations.

The 10 passengers had planned to hire two light aircraft. In the circumstances two Cessna Cessna 206s would have been ideal for the task. The pilot however, told the passengers that one 7 seat twin engine transport was adequate for the flight. This was because three of the passengers were children aged 5, 4 and 11 months. Regulation 67(8) requires children aged 2 years and above to occupy their own seats. In this group, only the 11 months infant qualified to sit on the lap of another passenger. The infant was required to be strapped by means of a seat belt extender.

The pilot did not prepare a load sheet for the flight, nor did he verify the ages of the children accompanying the adults. The children of 5 and 4 years could not have been mistaken for infants. The passengers also complained that there was no briefing before the flight and there were no infant seat belt extenders.

The pilot had not flown to Matambwe for seven months. He said that he learnt from a pilot of a Cessna 182 that the runway was usable. It was a rainy season and many runway surfaces in the country had been damaged.

### **Conduct of the Flight**

Investigations have established no defects in the aircraft which could have contributed to this accident. The take off from Dar es Salaam and the flight to Matambwe were uneventful. On reaching Matambwe the aircraft circled twice overhead the airstrip. This is the normal

procedure whose purpose is to check the condition of the runway, to ascertain the direction of the wind and to chase animals away from the runway. It also serves to alert ground parties about the arrival of an aircraft.

The aircraft was observed to touch down on runway 28 subsequent to which it rolled on the flat portion of the runway. 5H-MUX was heard increasing power as it approached the crest of the runway, becoming momentarily airborne before it collided with trees located just beyond the end of the runway.

The pilot made the attempted landing with full flaps, which was the recommended configuration for short field landing. However, the overshoot was attempted with full flaps still deployed and this was a major factor in the failure to gain speed for the attempted take off. The pilot had not made any proficiency training for 17 months.

### **Carriage of Children not occupying Seats**

According to regulation 67 (8) of the Tanzania Air Navigation Regulations 20003, only infants under 2 years of age are allowed to share seats with an adult. There was only one infant of 11 months on the flight. The two children of 4 and 5 were supposed to occupy their own seats.

### **Matambwe airstrip**

Only 700 meters of the runway at Matambwe was usable. The remaining 500 meters was outgrown by grass. The active runway had significant down slopes at both ends. However, not all the 700 meters of runway 28 were usable. There was uncompleted earth work at the beginning of the uphill slope of runway 28 which effectively reduced its length. For this reason, the runway was good for short take off and landing aircraft, notably the light single engine aeroplanes but was very tight for high speed twins of the PA31 transport category.

Further more, the down slopes at both ends meant that the pilot cannot see the end of the runway whilst rolling on the flat surface. It is only upon reaching the crest that the end of the runway comes in sight. Indeed some operators at Dar es Salaam International Airport had stopped flying into Matambwe airstrip due to the condition of the runway.

### **The operator**

DJB Limited was a registered operator holding an Air Operator's Certificate No. 049-2006/07. The company was licensed to conduct charter flights. DJB was operating two aircraft, one six seat Piper PA 34-200T Seneca and one eight seat Piper PA 31-310 Navajo. The latter aircraft was attached to DJB Ltd by Safari Air Ltd, who was the operator.

There were weaknesses in the management and operations of the company. The Chief Executive did not take an active role in the running of the company. He had left the day to day activities of the company to the Chief Pilot. The Chief Pilot was at the same time performing the functions of the Operations Manager and Training Captain. At the time of the



accident the Chief Pilot was outside the country and was in the process of leaving the company. DJB Limited did not notify the Tanzania Civil Aviation Authority about his departure within 14 days as required by the AOC conditions set in line with the requirements of Regulation 58(4) of the Tanzania Air Navigation Regulations, 2003.

In the period immediately after the accident the Tanzania Accident Investigation Branch failed to identify the contact person in the company who was directly responsible for the administration of the accident. There were also complaints from the passengers about the failure of the operator to fulfill his obligations including following up the insurance settlements. The Air Operator's Certificate of DJB Limited has since been revoked.

The company had about 10 years experience in the aviation industry. It started with a PA-34 Seneca, as transport for its executives.

### 3. CONCLUSIONS

#### (a) Findings

- (i) The aircraft had been issued with a valid Certificate of Airworthiness and had been maintained in accordance with an approved maintenance schedule.
- (ii) The pilot was properly licensed to conduct the flight.
- (iii) The pilot was not current on proficiency checks
- (iv) The aircraft maximum take off weight was not exceeded but there were two passengers who did not have seats.
- (v) Following an aborted ground roll, take off was initiated with full flaps deployed.
- (vi) The aircraft failed to climb and collided with trees beyond the runway.

#### (b) Cause

The accident was caused by the aircraft colliding with trees just beyond the end of the runway. The failure to select the correct flap position for the take off, the lack of proficiency training, insufficient flight preparation and lack of real time information on the runway at Matambwe were contributory factors.

### 4 SAFETY RECOMMENDATIONS

#### **It is recommended that:**

- (i) Regulations governing pilot proficiency checks and the occupancy of aircraft seats should be followed by all pilots.
- (ii) Pilots should always find accurate information about destination airfields before attempting all flights.
- (iii) TCAA should increase surveillance on operators, particularly on the operations of small operators to ensure that they comply with the AOC requirements.
- (iv) All owners/operators of unmanned airstrips should institute a method of making current airport information readily available to air operators.