

MINISTRY OF WORKS, COMMUNICATION AND TRANSPORT

ACCIDENT INVESTIGATION BRANCH

CIVIL AIRCRAFT ACCIDENT NO. CAV/ACC/4/94

REPORT ON THE ACCIDENT TO CESSNA 402B
AIRCRAFT REGISTRATION 5H-MPR WHICH OCCURRED
ON 6 MARCH 1994 AT ARUSHA AIRPORT, ARUSHA, TANZANIA
(03° 22'S 36° 38'E)

AIRCRAFT ACCIDENT NO. CAV/ACC/4/94

Aircraft type : Cessna 402B
Nationality and Registration Marks : 5H-MPR
Engines : Two Continental TSIO-520-E
Registered Owner : Precision Flight (Africa) Ltd.
Box 1636 Arusha, Tanzania.
Operator : Same as registered owner
Pilot : One - Uninjured
Passengers : Three - Uninjured
Place of Accident : Arusha Airport
Arusha, Tanzania
(03° 22'S 36° 38'E)

ALL TIME IN THIS REPORT ARE UTC

SYNOPSIS

The aircraft was executing a take-off ground roll. When it had reached near take-off speed a bang was heard on the left main gear. The pilot decided to continue with the take-off. He made a successful take-off and after being airborne he circled round the airport and executed a safe landing. All the four occupants were not injured. The aircraft sustained substantial damage to its left main gear and its attachment points. The left tip tank was also damaged.

1. FACTUAL INFORMATION

1.1 History of the Flight

The aircraft was operating a company charter flight to Dar es Salaam. It was carrying one pilot and three passengers. The pilot said that he had previously carried out a pre-take - off checks and was satisfied with the condition of the aircraft.

The weather at Arusha was good with no wind and he decided to use runway 09 for take off. The take off ground roll was normal. When the aircraft had accelerated to near take off speed a loud bang was heard on the left main gear. Realising that the remaining run was about 70 metres only and aborting the take off would be dangerous, he decided to continue with the lift off.

After the aircraft was airborne, the pilot circled round and landed on runway 27. The landing was successful and the occupants disembarked without injuries.

The pilot subsequently inspected the aircraft and established that there was a fuel leak on the left main tank which was damaged. There was visible damage on the left main gear door.

With the company of the airport's operations Manager the pilot proceeded to inspect the runway in order to establish the cause of the bang. In the course of the inspection it was found that the left main gear leg had impacted a heap of gravel which was near the edge of the runway (see appendix 1). This heap was about 18 inches (46 cm) tall.

1.2 Injuries to Persons

INJURIES	CREW	PASSENGERS	OTHERS
Fatal	Nil	Nil	Nil
Serious	Nil	Nil	Nil
Minor/None	1	3	

1.3 Damage to aircraft

The aircraft sustained substantial damage to its left main landing gear assembly and the left wing tip fuel tank.

1.4 Other Damage

There were no third party damage.

1.5 Personnel Information

The pilot was born on 28 October 1956 at Pare, Tanzania. He held a Commercial Pilot's Licence No. HP 236 issued on 21 January 1984.

At the time of the accident he claimed a total of 3050 hours broken down as follows:

Day 2975 hours

Night 75 hours

He had the following ratings to his licence:

Group 1 : Cessna 172
Cessna 310
Cessna 402
DHC-6
PA-34

His experience on the type (Cessna 402) was 1020 hours.

1.6 Aircraft Information

The aircraft, a Cessna 402B serial Number 402B-0113 powered by two continental TSIO-520-E engines was manufactured by the Cessna Aircraft Company at Wichita, Kansas, USA in 1971. It was first registered in Tanzania on 18 March 1977 in the name of Business Machines(Tanzania) Ltd. P.O. box 1599 Dar es Salaam. A certificate of Registration Number 199 was issued. The ownership was changed to Precision Flight (Africa) Ltd. P.O. box 1636 Arusha on 21 May 1993.

5H-MPR was originally issued with a Tanzania C of A No. 693 on 13 February 1978 to expire one year later. The C of A has since been kept current. By the time of the accident the C of A was valid till 21 February 1994.

1.6.1 Loading and C of G disposition

The aircraft C of G was within the allowed limits.

1.7 Meteorological Information

There was no significant weather at the time of the accident.

1.8 Aids to Navigation

Not relevant.

1.9 Communications

At the time of the accident there was no Control Tower services at Arusha Airport.

1.10 Aerodrome Information

Arusha Airport, elevation 4550 feet (1387m) has a single runway 09/27 which is 5380 feet (1639m) long and 105 feet (32m) wide. Part of the runway had recently been re-surfaced with bitumen and gravel. At the time of the accident there was gravel (see appendix 1) in form of a cone-shaped

heap lying near the left edge of runway 09.

this gravel was left behind by the contractor who carried out the re-surfacing job some six months earlier. It was this heap of gravel which caused the accident.

1.11 **Flight Recorders**

None were required or fitted.

1.12 **Wreckage and Impact Information**

The damage on the left main gear was consistent with having struck an obstacle at high speed.

The left main gear door was found open and loose. One left gear link rod was bent. The gear bay was substantially winkled. Both the left main gear leg attachment pins were found bent.

The left propeller having struck the gravel had one of its blades chipped.

The left wing tip tank bulkhead was completely detached and all rivets pulled out. This damage appears to have come about as a result of deceleration loads. There was no evidence of impact with any external objects. The damage to the tank caused fuel spillage but there was no fire.

1.13 **Medical and Pathological Information**

Not applicable.

1.14 **Fire**

There was no fire.

1.15 **Survival Aspects**

This was survivable accidents.

1.16 **Tests and Research**

Not applicable.

2. **ANALYSIS**

It was evident from the examination of the accident aircraft that left main landing gear had hit some obstacle at high speed. This obstacle was identified as a heap of gravel which had been left on the runway by a contractor who re-surfaced the runway some six months earlier. The cone-shaped heap was 18 inches (46 cm) tall.

When the inspector of accidents arrived at the scene of the accident the gravel heap had already been removed. However, its location at the time of the accident had been marked.

The contractor who re-surfaced part of the runway was reported to have left this heap of gravel on the runway in anticipation that he would be awarded another contract to finish off the remaining part. The contractor also left some machinery and a shed on the left of runway 09 as shown in appendix 1.

This heap of gravel was an obstruction to the movement of aircraft. It should have been removed when the runway was opened for use.

Arusha Airport is owned by the Ministry of Works, Communications and Transport. The runway is inspected everyday at 0300 hours. Since the heap of gravel had remained in place for months it is evident that the Arusha Airport authorities had overlooked its safety implications. And so did the contractor.

The accident gravel heap was found to be 8.5 metres to the left of the centre of the runway. From the geometry of the aircraft, it has been estimated that 5H-MPR drifted about seven metres to the left during its take off ground roll.

Given that the runway had no centre line for central reference and the less than "bright" daylight conditions obtaining at the time of take-off, the drift of this magnitude cannot be described as abnormal.

The time of the day was 0330 hours which should give a local time of 6.30 a.m. This is within the allowed time for take-off from Arusha for this particular time of the year.

3. CONCLUSIONS

a) Findings

- 1) The commander was properly licenced and qualified to conduct the flight.
- 2) The aircraft had a valid Certificate of Airworthiness and a valid Certificate of Maintenance. There was no evidence of any defects in the aircraft which could have contributed to this accident.
- 3) The weight and centre of gravity of the aircraft were within the permitted limits.
- 4) The aircraft colided with a heap of gravel which had been left at the edge of the runway unmarked and was substantially damaged.

b) **Cause**

The accident was caused by the aircraft hitting a heap of gravel which had been left near the edge of the runway.

4. **SAFETY RECOMMENDATIONS**

It is recommended that:

- 4.1 The runway at Arusha Airport should have a centre-line.
- 4.2 In the light of what happened to 5H-MPR inspection of runways should be refined to include all obstacles including those located in the surrounding areas. These inspections shall be recorded and signed by competent personnel.



J. NYAMWIHURA

Inspector of Accidents.

Accident Investigation Branch
Ministry of Works, Communication and Transport,
March 1994.

ARUSHA AIRSTRIP
ON 06-03-94 with 5H-MPR

