



THE UNITED REPUBLIC OF TANZANIA

CIVIL AIRCRAFT ACCIDENT

REPORT ON THE ACCIDENT TO CESSNA 402B AIRCRAFT REGISTRATION 5H-BEC WHICH OCCURRED ON 7 FEBRUARY 1996 AT MBEYA AIRPORT

27

MINISTRY OF COMMUNICATION AND TRANSPORT

ACCIDENT INVESTIGATION BRANCH

CIVIL AIRCRAFT ACCIDENT NO. CAV/ACC/3/96

**REPORT ON THE ACCIDENT TO CESSNA 402B AIRCRAFT REGISTRATION 5H-
BEC WHICH OCCURRED ON 7 FEBRUARY 1996 AT MBEYA AIRPORT**

TANZANIA ACCIDENT INVESTIGATION BRANCH

CIVIL AIRCRAFT ACCIDENT NO. CAV/ACC/3/96

Aircraft type : Cessna 402B Utililiner II

Nationality & Reg Marks : 5H-BEC

Engines : Two continental TSIO-520-E

Registered Owner : Bharya Engineering & Contracting Co.
(BECCO) Ltd.
P.O. Box 1698 DAR ES SALAAM
TANZANIA

Operator : Nahalo Air Safaris Ltd.
P.O. Box 20066 DAR ES SALAAM
TANZANIA

Pilot : One-Uninjured

Passengers : Five-Uninjured

Place of Accident : Mbeya Airport

Date : 7 February 1966

Time : 1423 hours

SYNOPSIS

On 7 February 1996 at 1300 hours 5H-BEC took off from Dodoma for a flight to Mbeya. It was carrying one pilot and five passengers. The flight to Mbeya was normal and the aircraft reached Mbeya at 1420 hours. At this time it had stopped raining but there were low thick clouds. After circling three times the runway was located and the pilot made a straight-in approach on runway 31.

On touchdown the aircraft bounced on its right main landing gear and subsequently rolled down the runway. At it did so, the right main gear hit and ran over a concrete edge marker after which it collapsed causing the right wing and propeller to strike the ground. The aircraft subsequently veered to the right before it came to rest near the edge of the airstrip. The six occupants disembarked uninjured but the aircraft was substantially damaged.

It is concluded that the accident was caused by the collapse of the right main landing gear during the landing roll following the fracture of the down-lock mechanism. The down-lock mechanism failed in overload probably due to either a heavy landing or collision with the concrete runway edge marker.

1. FACTUAL INFORMATION

1.1 History of the flight

The aircraft was operating a charter flight from Dar es Salaam to Dodoma and Mbeya. It took off from Dar es Salaam at 0600 hours with one pilot and five passengers. The endurance was 0430 hours. 5H-BEC landed at Dodoma at 0730 hours. The aircraft subsequently took off for Mbeya at 1300 hours with the same occupants.

The flight to Mbeya was normal. As the aircraft came within the vicinity of Mbeya the pilot noticed thick low clouds in the foreground. He informed the passengers that the flight may have to land at Chimala or return to Dodoma due to bad weather at Mbeya. The passengers subsequently asked the pilot to request their Mbeya office through Mbeya Tower to arrange transport from Chimala to Mbeya town. The pilot tried to raise the Mbeya Tower on 118.1 MHz to no avail. The Tower at Mbeya airport was not manned at that time. One of the passengers said that during this time the Nyoka mountains were sighted. These mountains are a landmark for Mbeya. However, the airport was not visible.

After circling three times and when the aircraft was flying over Uyole the runway was sighted and the pilot executed a straight-in approach on runway 31. This, he said, was necessitated by the presence of low but thick cloud in the direction favouring runway 13. He further stated that due to the presence of pedestrians and cattle near the threshold of runway 31 he had to touch down 400 metres beyond the runway threshold.

Two passengers who were in the back seats said that they became airborne again after the initial touchdown. After the aircraft had regained the ground there was heavy vibration at the back during the subsequent ground roll.

The aircraft made a touchdown on the runway about five metres to the right of the centre-line. After it had settled on the ground it rolled in a straight-line towards the edge of the runway till the right main gear rolled over a concrete edge marker when it started veering back to the runway. The right main gear collapsed shortly after leaving the edge marker causing the right wing and propeller to strike the ground and the aircraft to swing to the right before it came to rest.

1.2 Injuries to persons

INJURIES	CREW	PASSENGERS
FATAL:	-	-
SERIOUS:	-	-
MINOR/NONE:	1	5

1.3 Damage to aircraft

The damage to the aircraft was confined to the right wing section including the propeller, the flap and the landing gear.

1.4 Other damage

None

1.5 Crew Information

The Pilot, Captain Solomon S. Namubano; was born on 28 November 1956 at Ngara, Tanzania. He held a Commercial Pilot's Licence No. HP 323 granted on 7 November 1988 on the strength of his Uganda CPL No. X-420CP issued on 26 August 1988. He also held a Flight Radio Telephony Operator's Licence No. 509 held in line with his CPL. His licence was due to expire on 5 May 1996.

By the time of the accident he had logged a total of 4272 hours of which 986 were on the type. He had the following ratings to his licence:

Group 1:

Cessna: 172, 310 and 402

Piper: PA23-250 and 31, 28-140

1.6 Aircraft Information

The aircraft, a Cessna 402B Utililiner II serial number 402B-1227 powered by two Continental TSIO-520-E engines was manufactured by the Cessna aircraft company at Wichita, Kansas, U.S.A in 1978. It arrived in Tanzania in 1981 with an Italian registration I-CCRR in the name of Strade Coop. Milano. It was subsequently registered as 5H-BEC in the name of Bharya Engineering & Contracting Company (BECCO) Limited, P.O. Box 1698 Dar es Salaam. A Certificate of Registration No. 271 was issued on 13th November 1981.

A Tanzanian Certificate of Airworthiness (C of A) No. was first issued on 22nd January 1982 to expire 12 months later. It has since been kept current through periodic renewals. By the time of the accident the C of A was valid till 12th November 1996.

1.6.1 Loading and C of G disposition

The aircraft's C of G was within the authorised limits.

1.7 Meteorological information

There had been light showers at Mbeya during the day. At the time of the accident it had already stopped raining. There were low clouds in the direction of runway 31. The wind was 280 deg at 08 Knots and the temperature was 18 deg C.

1.8 Aids to Navigation

Not applicable.

1.9 Communications

The pilot tried to raise the Mbeya Tower on 118.1 MHz during his flight but there was no reply. The tower was not manned at that time.

Reports from the Mbeya Tower said that the Tower had been closed at 1230 hours.

NOTAM BO/1995 was still in force. It stated that ATS hours of service are MONDAY TO FRIDAY 0430 - 1230 HOURS. SATURDAY/SUNDAY/HOLIDAY S - NIL

1.10 Aerodrome Information

Mbeya airport, elevation 5600 feet (1707 metres) has a single runway (13/31) which is 1558 metres (5112 ft) long and 30 metres (98 ft) wide. The runway surface is grass and is part of a grass strip which is 150 m (492 ft) wide. At the time of the accident the grass was tall. There were also small ant holes and ant hills on the runway.

Some shallow trenches 50 cm wide had been dug around the edge markers "In order to make them more visible". The effect of this was to raise the vertical edges of the markers above the level of the surrounding ground, but one of these was 8 inches (20 cm) high. At NOTAM (B0016) issued on 1 February 1996 cautioned pilots using runway 13/31 of unauthorised movements of peoples, animals and vehicles along the runway. Another NOTAM (B0014) advised that a wind sock was not available at Mbeya.

1.11 Flight recorders

Not required by regulations. None fitted.

1.12 Wreckage information

The wreckage was found near the edge of the airstrip at the right angle to the centre line of runway 31. It was about 700 metres from the runway 31 threshold and 40 metres to the right of the centre-line. The aircraft was resting on the nose gear and left main gear as well as the right wing.

The propellers

The left propeller remained clear of the ground in the accident sequence. It sustained no damage. The right propeller had all three blades bent backwards at the tips indicating that it was rotating at low power at the time of impact with soft ground.

1.15 Survival Aspects

This was a survivable accident.

1.16 Tests and Research

Not applicable.

2. ANALYSIS

2.1 The Landing Gear

It was evident from the examination of the wreckage that the accident was caused by the retraction of the right main gear during the landing roll. The other two landing gears remained down and locked in the accident sequence.

Examination of the right main gear assembly showed that its down lock mechanism had fractured and separated from its upper attachment point on the right main gear. All the fractures were fresh implying that there was no pre-crash failure. This failure could have occurred either from the collision with the edge of the concrete marker or from a heavy landing prior to the collision.

Examination of the concrete marker showed that height of the edge protruding above the surrounding surface was about 2.5 inches (6 cm). It had no sharp corners because of wear and tear through age. There was also no piece of concrete broken off by the impact. It was evident from tire marks on the concrete marker that the right main wheel had hit, climbed and rolled over the marker. There was no evidence of the wheel axle bending as a result of the impact.

From the tire marks and statements made by two passengers it was evident that 5H-BEC made its first touchdown on the right main gear and bounced before it regained the ground and rolled down the runway. One of the passengers who was seated in one of the back seats reported heavy vibration during the landing roll shortly after touchdown. In the circumstances, it would appear that the right main gear down-lock mechanism failed either on landing or on collision with the concrete edge marker.

2.2 Air Traffic Services at Mbeya

The airport at Mbeya is Government-owned and is open normally between sunrise and sunset (0348 hours to 1612 hours). Due to the shortage of controllers the Mbeya Tower was than manned from 0430 hours to 1230 hours on weekdays. There were no ATS services on Saturdays, Sundays and Public holidays. A NOTAM to this effect had been issued.

Operators wishing to use ATS services beyond the notamed published hours have to make prior arrangements with the Directorate of Civil Aviation. Tower services are particularly important for Mbeya since the runway is frequently used by pedestrians, vehicles and livestock and hence the need to send a vehicle to clear the runway for incoming or outgoing traffic.

2.3 Mbeya airport is equipped with rescue and fire fighting services operating in category ONE. However, the airport had been downgraded to category ZERO because the fire tender was out of service. A NOTAM to this effect had already been issued (NOTAM B0017/FEB '96).

2.4 Aircraft Documents

All the documents required for flight were examined at Mbeya. The flight manual, a copy of the flight plan and the weather report were not available.

2.5 Preparation for the flight

There was no evidence to show that the pilot obtained the weather forecast for Mbeya prior to his departure from Dodoma. He could also have contacted the Dar es Salaam Area Control Centre for weather information once he was airborne.

The pilot also tried to raise the Mbeya Tower on 118.1 MHz at about 1400 hours. He was unaware of the NOTAM which had been issued on the closing time of the Mbeya Air Traffic Services.

2.6 The weather

The weather at Mbeya was bad with low thick cloud. The pilot was himself unaware of the weather conditions till he arrived at Mbeya. It was also reported that the airport was not visible and the aircraft circled three times in the air before the runway was sighted.

The pilot said that he could not fly over the runway to chase animals and pedestrians because there were low clouds in the direction favouring runway 13. For this reason he chose to leap-frog the animals and pedestrians near the beginning of runway 31 and land just beyond the obstacles.

The attitude and speed of the aircraft just before touchdown is not known due to the absence of a flight data recorder. However, since the pilot went for the runway as soon as he sighted it and had to land within the available weather window it could have been difficult to stabilise the aircraft for landing.

3. CONCLUSIONS

a) Findings

- i. The pilot was properly licensed to conduct the flight.
- ii. The aircraft was well maintained and properly loaded.
- iii. There were no defects in the aircraft which could have contributed to the accident.
- iv. The preparation for the flight to Mbeya was inadequate.
- v. The right main gear collapsed during the landing roll causing the propeller and right wing to strike the ground.

b) Probable Cause

The accident was caused by the collapse of the right main landing gear during the landing roll following the fracture of its down-lock mechanism. The down -lock mechanism failed in overload probably due to either heavy landing or collision with the runway edge marker.

The weather was also a contributing factor.

4. SAFETY RECOMMENDATIONS

It is recommended that:-

The trenches dug around the runway edge markers at Mbeya airport be filled and compacted immediately.

The edge markers be re-painted white as required by regulations.

The airport at Mbeya should be fenced to prevent trespassing pedestrians and grazing livestock.

Ant holes in the middle of the runway and the surrounding areas should be filled and compacted, as well as insecticide be applied to keep out the ants.

Pilots should always make adequate preparations for each flight they undertake.


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