No. 5

Britten-Norman BN-2A Trislander, 5Y-CMC, accident at Nyeri Hills, Kenya on 24 July 1978. Report No. CAV/ACC/6/78 released by the Ministry of Power and Communications, Kenya.

SYNOPSIS

The aircraft used in the Public Transport Category by the Amphibians Air Charters Ltd., was on a VFR flight transporting ten Swiss tourists to Kenya game lodges. On the leg from Samburu Game Lodge to Wilson Airport the aircraft entered bad weather in the vicinity of Nyeri town and crashed on the northern slopes of Nyeri Hills. Out of eleven occupants, five were killed. There was no fire.

It is concluded that the probable cause of the accident was that the aircraft entered bad weather at a very low altitude and nearly zero visibility, thereby flying blindly into the hill.

1. INVESTIGATION

1.1 History of the Flight

The aircraft was making a charter flight in visual meteorological conditions (VMC from Mombasa, Malindi, Amboseli, Wilson, Meru Mulika, Samburu, Wilson, Governor's Camp, Kilaguni and then back to Mombasa).

The aircraft left Mombasa on 23 July, 1978, at 0400 hours with 6 passengers on board and 180 US gallons of usable fuel. On arrival at Malindi four more passengers came on board. The aircraft departed from Malindi at 0445 hours on the same day, taking 1 hour 15 minutes to Amboseli for a short stopover. The flight departed from Amboseli at 0830 hours for Wilson Airport for more fuel; the fuel uplift was 351 litres.

The flight left Nairobi Wilson with the same party, i.e. ten passengers and the same pilot and a total of 160 US gallons of fuel. The flight time to Meru Mulika was 50 minutes. On arrival at Meru Mulika at 1040 hours, they decided to night stop.

On 24 July, 1978, the party departed from Meru Mulika at 0500 hours arriving at Samburu at 0525 hours. At 0830 hours the flight departed from Samburu for Nairobi Wilson (a flight of 50 minutes). Since departure from Mombasa on 23 July until departure from Samburu on 24 July, 1978, the flight was conducted in VMC weather and was an uneventful flight.

Upon departure from Samburu, in clear weather, the pilot climbed to 8 500 feet on a standard setting of 1 013 mb. The pilot contacted Nanyuki Airforce base and asked for a clearance to cross Nanyuki zone and was asked to report time inbound, then abeam and then Naro Moru outbound. The pilot had flown this route several times before in the past in different types of aeroplanes and quite often had to make diversion including continuing by instrument flight rules (IFR) to Nairobi. The flight passed abeam Nanyuki at approximately 0855 hours.

The pilot states that at this time, i.e. abeam Nanyuki, they could not see the top of Mt. Kenya but could see the lower slopes, Mt. Kenya Safari Club and Nanyuki and that visibility was more than 15 NM.

The pilot further states that further along their flight path, there was a heavy build up of stratus clouds with scattered cumulonimbus sprouting out of the top. The clouds seemed to extend from 2 000 feet up to 11 000 feet and more.

The pilot called Nanyuki Airforce tower when abeam Naro Moru and was told to continue with East Air Centre. The flight left Naro Moru and the main road to Nanyuki was on the right.

The pilot states that at the prevailing temperature of 14°C (outside air temperature) the density altitude was 10 000 feet. Considering the performance of the aircraft (which has a service ceiling of 10 000 feet) the pilot decided to fly below the clouds and continue VFR. Therefore he started to descend from 8 500 feet. He then realized that the weather was deteriorating very rapidly and within the next minute or two the visibility had been reduced to a few yards. The pilot states he realized his proximity to the ground and at the same time realized the chances of turning back were not good, since he would have had to make a steep turn which would result in losing more height. He decided to climb, in almost zero visibility, to a safe height and so applied full power and initiated a climb. At this stage, he saw a glimpse of trees approaching on the flight path. So he increased the angle of attack for a more rapid ascent but to no avail. He felt the undercarriage hitting trees and the whole aircraft crashing through the trees.

The aircraft had normal R/T with East Air Centre and Nanyuki Airforce control but during the accident, the pilot had no time to radio either East Air Centre or Nanyuki Tower of this predicament.

Nyeri police, who had been informed of the accident by Mwenji Primary School teachers, visited the scene very quickly. They in turn informed East Air Centre by telephone.

1.2 Injuries to Persons

Injuries	Crew	Passengers	Others
Fatal	0	5	0
Non-fatal	1	5	0
None	0	0	

1.3 Damage to Aircraft

The aircraft was completely destroyed by trees.

1.4 Other Damage

Several trees were destroyed.

1.5 Crew Information

Pilot: Born on 14 November, 1948, Tanzanian by nationality.

Licence: Commercial Pilot's Licence No. 1249 (K 1134) issued on 9.7.71. Last renewal on 17.3.78 to expire on 27.3.79.

RT Licence:	No. 2166 (K 1599). Since the date of first issue, he has kept his licences valid.
Aircraft Rating:	Group 1 PA28, Cessna 210, Piper 34, Cessna 205/206, BN-2 MK III Trislander and BN-2 MK II Islander.
Total flying experience:	Approximately 3 430 hours.
Flying in command on type:	On 20.10.77 when completing a flight check on BN-2 MK III Trislander, he had flown the aircraft for 8 hours.
Flying hours in the last 28 days:	81.30 hours approximately.
Medical Certificates:	16.3.78 to be renewed on 15.3.79.

1.6 Aircraft Information

1.6.1 Construction, General Information and Maintenance

A Trislander BN-2A MK III-2, with a constructor's serial No. C-1032 and powered by three Lycoming O-540-E4C5 engines, was constructed by Britten-Norman (Bembridge) Limited of Bembridge Airport, Bembridge, England, in 1976.

The aircraft arrived in East Africa in possession of U.K. registration (G-BDWS) and issued with a U.K. Certificate of Airworthiness No. 7167 covering the period 18.3.77 up to 17.6.77. An East African Certificate of Airworthiness No. 1151 was issued on 18.10.77 up to 17.10.78. This certificate No. 1151 was valid at the time of the accident.

When this aircraft arrived in East Africa it was registered on 14.10.77 (5Y-CMC) in the name of CMC Holdings of P.O. Box 30135, Nairobi. At the date of the accident they were still the registered owners.

1.6.2 Weight and Balance

The East African Certificate of Airworthiness required that the aircraft be operated in accordance and in compliance with the operating limitations stated in the Flight Manual. The flight manual was part of the Certificate of Airworthiness and had to be carried in the aircraft at all times.

At the time of the accident, the weight of the aircraft was as follows:

Equipped empty weight	6 061 lb	
Pilot/1st passenger	200 "	row 1
Passengers 2/3	300 "	row 2
Passengers 4/5	300 "	row 3
Passengers 6/7	300 "	row 4
Passengers 8/9	200 "	row 7
Passengers 10	170 "	row 9
Rear compartment	100 "	baggage
	780 "	fuel-mains
	120 "	fuel-tips
Total pay load =	1 499 lb	
Take-off weight =	8 560 lb	

Maximum take-off and landing weight 10 000 lb. The C of G under the above loading conditions was within the loading envelope and in compliance with the Flight Manual.

1.7 Meteorological Information

The Meteorological reports for Nyeri were as follows:

Metar 0800:

Nyeri - Wind 130/05, visibility 8 km, slight drizzle, 5/8 stratus at 400 feet 8/8 stratocumulus at 1 200 feet, temperature 13°C, dew point 13°C.

Metar 0900:

Nyeri - W/V 160/08 more than 10 km in continuous drizzle, 5/8 stratus 600 feet 8/8 stratocumulus 1 400 feet, temperature 14°C, dew point 13°C.

From the above weather report (0800 and 0900 hours) it is noted that Nyeri area had very poor weather: 5/8 stratus at 400 feet, visibility 8 km in drizzle, 8/8 stratocumulus at 1 200 feet. Nyeri Hills are approximately 6 640 feet above MSL. The overlying lowlands are approximately 5 800 feet above MSL.

1.8 Aids to Navigation

5Y-CMC was equipped with standard two way RFT communication and was properly equipped for Instrument Flight Rules, i.e. it had ILS, VOR and ADF.

1.9 Communications

Normal RTF communication was carried out between the aircraft and all the relevant Air Traffic Control Units on VHF frequencies and at no time did the aircraft contact any ATC unit with any adverse report.

1.10 Aerodrome and Ground Facilities

Not applicable.

1.11 Flight Recorder

Not required and not fitted.

1.12 Wreckage

From the examination on the trees felled, it would appear that the aircraft struck the trees with considerable force in a slightly nose-up attitude. The force of the impact split the fuselage into two longitudinally. The right wing was approximately 30 yards from the main wreckage, the left wing approximately 10 yards away. The right landing gear had separated from the plane. The left landing gear was still attached but pointing upwards.

The left engine had detached from its mountings and flown for approximately 50 yards further on where it had hit a huge tree. The blades were twisted backwards. The right control column had broken off while the left side control column had bent. The cockpit area was crumpled with several cables sheared. The main wreckage was confined to one area on a relatively steep slope. The altimeter, set on 1 013 mb, was reading 6 640 feet. Flaps were selected up but were down. Throttles were full forward, mixture full rich, pitch full fine. Mags selectors were broken. Auxiliary pumps were off while transfer pumps were also off. Frequencies set were 119-7 MHz on No. 2 Communication

118-47 on No. 1 VOR 113.1 on NAV 1. ADF 388 was selected but had slightly moved on impact. Everything else had gone back to zero. Directional gyro was reading 090° while magnetic compass was reading 030°.

1.13 Medical and Pathological Information

Five out of eleven occupants were killed, while the others received injuries. From the type of impact it was evident that all the occupants could have been killed instantly when the aircraft struck huge trees while on full power due to the violent de-acceleration and consequent disintegration of the whole plane.

1.14 Fire

There was no fire.

1.15 Survival

Although six occupants received injuries only, this accident is classified as not survivable.

1.16 Tests and Research

Physical inspection of wreckage.

1.17 Other information

It is known that the aircraft was properly loaded and that the pilot though instrument rated was on a VFR flight when he encountered poor weather. It is also known that he had commenced to descend from 8 500 feet in cloud in the hope that he would be able to encounter VFR weather below.

2. ANALYSIS

The pilot had flown on 23 July in VFR weather. On 23 July when he departed Samburu the weather was VMC but after passing Naro Moru at 8 500 feet, he encountered poor weather. Considering the aircraft performance the pilot made a hasty decision to descend so as to maintain VFR below cloud. He thereupon flew too low into the clouds and very poor visibility. Being in cloud and at very low level (he nearly touched the buildings of Mwenji Primary School which is at the slopes of Nyeri Hill) he thought he could not turn back and therefore he applied power for a climb to higher, safer altitude.

3. CONCLUSIONS

3.1 Findings

i) The pilot in command was properly licensed.

ii) The aircraft Certificate of Airworthiness was valid.

iii) The aircraft was properly maintained and C of M was valid.

iv) The aircraft was properly loaded and its centre of gravity within the recommended limits.

v) Although the pilot was fully qualified he made a misjudgement of the weather therefore making a wrong decision to descend from a safe altitude and broke the VFR flight rules.

3.2 Probable Cause

The probable cause of this accident was that the pilot flew VFR in IMC weather at a very low altitude, thereby flying blindly into a hill.

4. RECOMMENDATION

Pilots are advised to stick strictly to VFR if on a VFR flight. Any descent to VFR weather below should be accomplished in visual meteorological conditions.

ICAO Note: The pilot's name deleted by ICAO.

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