

No. 18

Air Cameroun, Douglas C-54, TJ-ABC, accident at
Douala Airport, Cameroon, 13 June 1961.
Report released by the Director of Civil Aviation, Cameroon.

Circumstances

The flight was the last being made in order to complete the pilot's training for a DC-4 type rating. The crew consisted of an instructor, the trainee-pilot, a radio operator and an engineer.

The first training session of the day had taken place during the afternoon from 1638 - 1755 hours at which time the pilot had performed ten take-offs and landings for the instructor including several with one engine inoperative and the propeller feathered. Circuits had been flown at heights between 150 and 200 ft.

The second part of the session was to include take-offs with one engine on reduced power.

Following a twenty-minute break, the aircraft took off from runway 12 at 1816 hours (i.e. at night), flew along its extended centreline, made a 180° turn and landed in the opposite direction on runway 30 at 1826 hours. After making a half-turn at the end of the runway, the aircraft took off at 1831 hours from runway 12. According to the controller in the tower and to witnesses, the aircraft lifted off only in the last quarter of the runway in a very shallow climb. Twenty seconds after take-off and slightly to the left of the runway centreline, a ball of fire was seen. This was followed by a ground fire. The four crew were killed instantly, and the sole passenger aboard was fatally injured in the accident which occurred at 1833 hours GMT.

The wreckage was located about 1 500 m from the end of runway 12 and 500 m to the left of its centreline amid

trees 50 m or more above the aerodrome level.

The Aircraft

The certificate of airworthiness delivered 24 April 1961 for the aircraft was marked "provisional document" being the "equivalent of a permit". The last airframe inspection had also taken place on 24 April 1961.

Since the last periodic inspection of the power plants they had flown -

No. 1	37.55 hours	No. 3	37.55 hours
2	33.55 hours	4	37.55 hours

The propellers, since the last overhaul and periodic check, had completed the following number of hours service:

No. 1	3 547.24 hours	No. 3	1 849.40
2	869.09 hours	4	1 183.11

Crew Information

The instructor held a valid airline transport pilot's licence, an assistant-instructor's rating valid until 29 July 1961 and was authorized to check the ability of the company's pilots on DC-4 aircraft. He had flown a total of 13 412 hours including 2 750 at night. During the two months preceding the accident he had flown 192 hours on this aircraft type. His total hours flown on this type (as entered in his log book) was 212 since October 1958.

The trainee-pilot held a valid airline transport pilot's licence with a type rating for C-46 aircraft issued on 1 June 1961.

His total number of hours flown amounted to about 14 965 of which 1 142 hours had been flown by night. On the DC-4 aircraft he had flown 62.35 hours (dual controls), two hours having been flown within the 48 hours preceding the accident.

The two other crew members aboard, i.e. the radio operator and flight mechanic, also held valid licences and had the following experience:

radio operator 10 380 hr by day
 474 hr (partial night)

He had flown 53 hours on this aircraft type during the two months preceding the accident.

flight mechanic 11 523 hr by day
 650 hr (by night)

During the two months prior to the accident he had flown 333 hours on the DC-4.

Reconstruction of the final flight

The afternoon's training session was interrupted by an incident with a hydraulic lock of No. 4 engine. Because of this the engine could not be restarted, and the oil of the lower cylinder had to be emptied by counter-rotating the propeller. However, according to the chief engineer for Air Cameroun, engine No. 4 was operating normally before the last take-off.

Power on No. 4 engine was reduced during the take-off which took place at 1831. The aircraft had difficulty in lifting off the ground but finally became airborne on the last third of the runway. The landing gear and flaps were retracted immediately. It also may be assumed that the take-off was performed without flaps as the instructor had informed the pilot during the afternoon that the nose wheel tended to shimmy at high speed. Because the shimmy made it difficult to read the instruments, the instructor intended to have them read off to the trainee-pilot. The aircraft took off in a very

shallow climb because of the braking of engine No. 4 and the immediate flap retraction, and a left turn was initiated before reaching 150 ft.

Approximately 1 200 m from the end of runway 30, the propeller of engine No. 2 slashed a tree, severing it and smashing the propeller to pieces. The aircraft was then nosed up but struck a second tree. Momentum was lost, course was altered and the aircraft broke up, cutting a swath in the trees. Following the second impact the fuel tanks burst and caught fire. Propellers 1, 3 and 4 and engines Nos. 1, 2 and 3 were projected forward; the left wing and left wing root ripped from the fuselage which continued on its path. The right wing then smashed against a tree 200 m from the first point of impact and fell in front of the fuselage after losing engine No. 4 in its fall.

Findings at the accident site

The wreckage of the aircraft was located 1 459 m from the approach end of runway 30, its direction forming an angle of 20° with the extended runway centre-line.

A tree, 274 m from the farthest piece of wreckage (the right wing), was severed at a height of 40 m. Forty-five metres closer in, the top of a very large tree, more than 50 m high, was broken off. A third point of impact was found 150 m from the first on a tree 80 cm in diameter. Its trunk was broken at a height of about 15 m. From that point, the path of the aircraft, which had followed the edge of the forest, entered into an area consisting mostly of soft wood. The path of the machine was thus visible for 274 m. Debris was scattered along the axis of the aeroplane's path over a rectangular zone about 270 m by 150 m.

Two hundred metres from the machine's first impact and 15 m to the left of the track the three engines Nos. 1, 2, and 3 were grouped in a radius of 6m. Engine No. 4 was lying 7 m ahead and to the right of the wreckage of the cabin.

The propellers seemed to be all at fine pitch, but the stops of the blades were damaged.

The fuselage, entirely destroyed by fire, was 240 m from the first point of impact. It had not crashed into the ground but slid and tilted to the left.

The two wings were found with most of the ailerons and flaps, the latter being in the retracted position. The left wing was lying a few metres to the left of the path of the aircraft, 125 m from the first tree. The right wing was to the right and ahead of the fuselage, 274 m from the point of first impact.

The indications of the aircraft's instruments could not be considered as primary evidence but merely as data in support of other positive evidence.

Probable Causes

The accident was caused by flight at too low an altitude during a night training exercise.

According to witnesses, the instructor had directed the pilot to circle the runway at an altitude of 150 ft during the first training exercise; it appears that this instruction was maintained for the same exercise by night.

Assuming that take-off was made with flaps extended, it so happened that complete retraction of the flaps occurred practically at the time of impact with the first tree. In fact, it can be estimated that the flight lasted 30 - 40 seconds from the time of take-off to impact with the first tree. Retraction of the landing gear takes 15 seconds and of the flaps approximately 10 seconds. Rapid retraction of the flaps at low speed causes the aircraft to nose down. It is possible that the loss of altitude occurred just before reaching the curtain of trees. Flaps are normally retracted gradually after reaching an

altitude of 200 ft in visual meteorological conditions and 400 ft in instrument meteorological conditions or at night. The normal path of a DC-4 with one engine on reduced power at take-off, climbing speed 400 - 500 ft/min, made it impossible for the aircraft to clear the tops of the trees which it struck.

Assuming the take-off was made without flaps - a manoeuvre not recommended during night flights at Douala - the path followed would have inevitably brought the aircraft into the trees.

It should be noted that the Air France DC-4 Manual prohibits counter-rotating the engine propeller in case of hydraulic lock; this manoeuvre merely forces the oil into the intake pipe and can render the engine inoperative. Even though this prohibited manoeuvre was followed, it does not appear that it was one of the causes of the accident; the incident would most certainly have occurred during the first aerodrome circuit after the return to the parking area.

In conclusion, it appears that the accident should be ascribed to lack of seriousness and judgement on the part of the instructor.

Pilot fatigue may also be invoked after a two-hour training flight at very low altitude under the constant supervision of the instructor. The pilot was a very serious, methodic and calm flier, but he did not have sufficient authority to disregard the unduly risky manoeuvres urged upon him, as confirmed orally by a flight mechanic who had flown with the crew involved in the accident.

Recommendations

Instructor ratings

It is essential that instructor ratings, even provisional ones, be issued with the greatest caution.

Search and rescue services

Considering the difficulties of access to the accident site, the search and rescue services arrived without undue delay. No vehicle was able to reach the wreckage. The passenger, who was still alive, was transported under extremely difficult conditions.

In order to provide for more rapid assistance to aircraft that may crash

along one of the sides of the extended runway centreline (road usable over 1 800 m), it is recommended that 500 m access ways, which can be used by jeeps, be provided at right angles to the extended centreline at approximately 300 m intervals i.e. up to the edge of the take-off flight path.

Fire fighting services

The fire fighting services should be provided with strap-on portable extinguishers and powerful lighting equipment.

Training
Take-off
Collision - trees
Pilot - operating recklessly - carelessly (unsafe manoeuvres at low altitudes)

C-54, TJ-ABC, 13/6/61

FIGURE 7



(Georges Prunet)

FLOOR OF PASSENGER COMPARTMENT WITH UPPER PART MISSING

FIGURE 8



(Georges Prunet)

FORWARD FUSELAGE AND NOSE WHEEL