

ACCIDENT INVESTIGATION BRANCH
CIVIL ACCIDENT REPORT CAV/ACC/24/76

AIRCRAFT: Cessna U206F 5Y-A00
ENGINE: Continental 10-520-F
REGISTERED OWNERS: Kevin Air Services
OPERATOR: Brokonsult AB
CREW: Pilot J.K. Fitzsimmons
PASSENGER: Nil
PLACE OF ACCIDENT: Geita, 60 nautical miles S.W. of Mwanza Tanzania
DATE AND TIME: 28-9-76 at 06.25 hours.

ALL TIMES IN THIS REPORT ARE GMT

S U M M A R Y

The aircraft was on a flight from Mwanza to Geita intending to come back to Mwanza. On take-off from Geita, aircraft failed to gain height after take-off. The pilot decided to do a forced landing on a swampy clearing 150 yards beyond the end of runway.

1.1 History of the Flight

The aircraft left Mwanza at 05.25 hours with one passenger and supplies for the operating company staff. The passenger disembarked and at 06.10 hours the aircraft was taking-off for Mwanza. Shortly after lift-off approximately 15-20 feet above the ground, the pilot stated that the aircraft could not climb any higher and decided to do a forced landing on a swampy ground 150 yards beyond end of the runway.

1.2 Injuries to persons

INJURIES	CREW	PASSENGER	OTHERS
FATAL	NIL	-	-
NON-FATAL	1	-	-
NONE	-	-	-

1.3 Damage to Aircraft

On impact the aircraft tipped over sustaining substantial damage to the propeller, nose landing gear, engine mounting frame, the starboard wing and the fin. The starboard wing rear spar and the cabin main frame was damaged.

1.4 Other damage

Not applicable.

1.5 Crew information

Mr. J.F. Fitzsimmons holds an East African Commercial Pilot's Licence No. 1666 (K1497) issued on 7-1-76 valid until 24-11-76 rated for group one and two aeroplanes:-

Group One: Piper PA23, 32, 34; Cessna 172, 180 and 206

Group Two: Douglas DC3; DHC-6; Beech Baron C55; Cessna 310/320; BN2A and West Wind III.

Mr. Fitzsimmons also holds an East African R/T Operator's Licence No. 2082 (K1532) kept valid as the CPL mentioned above.

The Commercial Pilot's Licence was issued on strength of an East African Airlines Transport Pilot's Licence No. 1145 (K1036) which is no longer valid on failing to do an instrument Rating flying test for renewal of licence.

Flying Experience

Experience claimed on application for renewal of licence dated 26th May, 1976 is as follows:-

Pilot in command by day	5281 hours 30 minutes
Pilot in command by night	467 hours 25 minutes
Second pilot by day	3889 hours 20 minutes
Second pilot by night	1494 hours 25 minutes

Mr. Fitzsimmons has been involved in two previous accidents.

1.6 Aircraft Information

The aircraft a Cessna U206 serial No. U206-01710 powered by single Continental 10-520-F engine was manufactured by Cessna Aircraft Corporation Wichita USA in 1971.

The aircraft arrived in East Africa in possession of an FAA Export Certificate of Airworthiness No. E103669 issued on 6-12-71. An East African Certificate of Airworthiness No. 692 was issued on 31-12-71 and has since been kept current up to the present validity which expires on 17-2-77.

Maintenance History

The aircraft was operated in the Public Transport (passenger) Category and was maintained to an approved schedule reference SAS/ALA/issue III all inspections required by this schedule were complied with.

Aircraft total hours since new	1765.9 hours
Aircraft total hours since check II	87.3 hours
Engine total hours since new	1639.9 hours
Engine total hours since O/H	285.4 hours
Propeller total hours since new	1866.3 hours
Propeller total hours since O/H	671.5 hours

1.7 Meteorological Information

There is no meteorological station in the vicinity of the accident. The pilot stated that at time of take-off the weather was clear and slight tail wind of 2 to 3 knots.

1.8 Aids to Navigation

Not applicable.

1.9 Communications

Not applicable

1.10 Aerodrome and ground facilities

The landing strip at Geita, elevation 4,900ft above sea level is not registered and is unmanned. No ground facilities are provided. The landing strip has two runways. Runway 12/30 which was used for take-off is approximately 2500ft long and approximately 75ft wide. The surface is grass covered with patches of sandy soil. The airstrip lays in a basin surrounded by ridges on the northern and eastern side and a swamp 150 yards from end of runway. Tyre marks on runway suggests that aircraft landed on runway 12 and turned for take-off on runway 30 at a point half way along the length of runway with 1250ft available for take-off.

1.11 Flight Recorder

Not fitted and not required by regulations to be fitted.

1.12 Wreckage

The aircraft crashed on a swamp beyond the end of runway directly on the take-off path. The nose gear came in contact with the ground first and the aircraft tipped over on its back. The aircraft was subsequently pulled up right and towed to the end of runway before an inspector of accidents arrived at the site, causing slight damage to the lower fuselage skin. On examination of the aircraft none of its main components had separated from the aircraft and damage was confined to the propeller, nose landing gear, engine mounting frames, the starboard wing and the fin tip. The starboard wing rear spar was buckled up and skin around the wing/fuselage pick up point and the main cabin frame was wrinkled. The cargo pack was extensively damaged and the fuselage had a hole six inches long on the left hand rear side.

Cockpit indications and control settings were as follows:-

Altimeter - 4900ft

Fuel Selector - Right tank

Fuel quantity - R.H. tank $\frac{1}{4}$ full, LH tank $\frac{1}{4}$ full

(Aircraft was last refuelled at Mwanza on 26-9-76. Fuel on board at time accident 40 galls).

Throttle control - Closed

Mixture control - Full rich

Propeller control - High RPM

Flaps - Fully down

Rudder trim - nose right

All switches were found to be in the off position.

1.13 Medical and Pathological Information

Not relevant to the accident.

1.14 Fire

There was no fire.

1.15 Survival Aspect

The accident was survivable. The pilot evacuated the wreckage with slight injuries and facial cuts.

1.16 Test and Research

Investigation was confined to possible cause of engine loss of power and to assessing the aircraft's published take-off performance.

Loss of Engine power

Inspection of the following systems was carried out on the site of accident.

Engine installation: controls, fuel and oil pipes, engine and propeller mounting - found satisfactory.

Fuel system: both tanks indicated ¼ full, fuel line disconnected at injector pump inlet and with auxilliary electric pump running fuel flow was found to be satisfactory.

Ignition system: Magnetos, spark plugs, high tension and switch leads found satisfactory.

Propeller system: one blade was found to be swivelling freely in the hub.

The following components were removed for further inspection and test at Safari Air Services workshops:-

Engine driven fuel pump, injector, manifold valve, and discharge nozzle with the associated fuel lines were installed on a test rig and tested for flow and pressure and found satisfactory.

Magnetos complete with high tension leads and a set of spark plugs assembled on a test rig, magnetos run at 33,000 RPM - and found to function satisfactory.

Main fuel filter and injector filter removed and found clean. Fuel sample from tanks indicated no water contamination.

Oil filter was removed cleaned and no metal particles were found.

Propeller was dismantled and one blade pitch change link pin was found to have sheared consistent with blade impact with the ground causing the blade to swivel freely in the hub.

None of the above inspection and test revealed any malfunction that could cause sudden loss of power.

Climb performance

From information available, it is not possible to assess with any degree of accuracy the take-off and climb performance. However, the aircraft owner's manual for Cessna U206F under FAA type Certificate No. A4CE gives performance for the following conditions:-

Gross wt. - 3600 lbs.

Altitude - 5000ft.

Temperature - 41°F.

Take-off run required from hard surface runway with 20° flaps in zero wind is 1,245ft.

Distance to clear 50ft. obstacle is 2,450ft.

Rate of climb for the same conditions is 640ft/min at an indicated airspeed of 96 MPH.

Take-off distance increases by 10% for each 20°F above standard temperature for particular altitude.

Operations from dry grass runway, increases the distance by 5%.

Rate of climb decreases by 30ft/min for each 10°F. above standard day temperature for particular altitude and with a cargo pack, rate of climb is reduced by 45ft/min.

Under the above conditions which are more adverse than prevailing conditions at the time of accident, the take-off ground run available if full length of runway 30 was used is adequate. For take-off run as indicated by tyre marks on runway only approximately 1,250ft was available and if consideration is given for effects of temperature and runway surface this distance is marginal.

It is recommended in the owner's hand book that if 20° flaps are used for take-off they should be left down until all obstacles are cleared. To clear an obstacle with 20° flaps, a 78 MPH climb speed should be used. Flap deflections greater than 20° are not recommended at any time for take-off.

On inspection of aircraft after the accident flaps were found in the fully down position and the pilot states that this position was selected for emergency landing. If the pilot adopted the standard recommended take-off technique, the aircraft was within published take-off performance limits.

Analysis

A factor to consider is the pilot's statement that immediately after lift off, aircraft failed to climb though the engine was running and suspecting an imminent engine failure he decided to do an emergency landing. Recommended action on loss of power was not followed.

No reference was made to the cockpit indications to ascertain satisfactory function of the engine or aircraft performance. There was no prior warning of an imminent engine failure nor defects on engine or any of its system that could cause sudden loss of power was experienced on the previous flight and none was found on subsequent inspection after accident. Probable cause of failure to climb is a stalled condition if no attempt is made to level off immediately to accelerate to a safer climb speed when using 20° flap for take-off.