

# AIRCRAFT ACCIDENT INVESTIGATION BOARD

# FINAL AIRCRAFT ACCIDENT REPORT FOR A CESSNA U206 9J-RHE THAT OCCURRED ON 3<sup>RD</sup> SEPTEMBER, 2019 IN SHIWANG'ANDU, MUCHINGA PROVINCE

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### INTRODUCTION

On the 3<sup>rd</sup> of September, 2019 at about 14:20 hours local time, an accident involving a Cessna Aircraft was reported to the Director General Civil Aviation Authority (by Skytrails Limited Management) who immediately relayed the information to the Aircraft Accident investigation Board. The aircraft involved was a Cessna U206, National Registration Marks 9J-RHE, Manufacturer's Serial Number U206-1033, belonging to Skytrails Limited, which was reported to have crash landed at Shiwangandu airstrip in Muchinga Province.

The interim Director Aircraft Accident Investigation Board immediately constituted an investigation team made of 4 staff pertaining to the domains of operations, aerodromes and airworthiness to travel to the accident scene.

### SYNOPSIS

The Aircraft took off from Kenneth Kaunda International Airport at approximately 11:15 Hours local time with 1 pilot and 4 passengers on board enroute to Mfuwe via Shiwangandu. On landing at Shiwangandu, the aircraft ballooned twice and at the third attempt the aircraft landed with three wheels on the ground which resulted in the nose wheel coming off. The fork made contact with the ground without the nose wheel, subsequently dragging on the oleo which led to its collapse and the propeller hitting the ground approximately on the runway centre line. Everyone on board came out of the aircraft when it finally came to a stop with no injuries. The investigation concluded that the accident was due to the collapse of the nose landing gear, and allowed the identification of possible contributory and latent factors.

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# **1. FACTUAL INFORMATION**

### 1.1 History of the Flight

The Aircraft took off from Kenneth Kaunda International Airport at approximately 11:15 Hours for a commercial flight operated by Sky Trails Limited with two (2) SkyTrails limited staff (Pilot & Mechanic) and three (3) Department of National Parks and Wildlife passengers (Surveyors) on board enroute to Mfuwe via Shiwangandu. The flight took approximately three hours.

Meteorological flight conditions at the point of departure were focused as follows:

- 1. Surface wind: 120 at 17 knots(32km/h)
- 2. Temperature: +30 degrees
- 3. Weather: CAVOK (Ceiling and Visibility OK)
- 4. QNH: 1025 mili bars, as provided by Sky Demon per navigation log.

No meteorological information were available to the pilot at arrival in Shiwangandu. On arrival, the pilot flew over the airfield to make sure it was clear of any wildlife runway incursions for landing after which he did a circuit and approached landing on airfield 08. At flaring for landing the aircraft ballooned on touch down and the pilot attempted a second time to put down the aircraft. The aircraft ballooned once again. On third attempt the aircraft landed with three wheels on the ground. The nose wheel came off and was seen rolling in front of the aircraft by both the pilot and the passengers.

The fork made contact with ground without the nose wheel, subsequently dragging on the oleo which led to its collapse and the propeller hitting the ground approximately on the runway centre line. Everyone on board came out of the aircraft when it finally came to a stop with no injuries.

The pilot made contact with Sky trails Limited base who later contacted Civil Aviation Authority to report the accident.

The above account was obtained from the pilot, the mechanic and the three (3) Department of National Parks and Wildlife officials who were on board the aircraft, and were interviewed at different times.

# **1.2 Personnel Information**

The Captain is a Zambian born on 12<sup>th</sup> December, 1953 (65 years 8 months old at the time of the accident). He is a holder of an Airline Transport Pilot's License (ATPL) with a Medical Certificate validity that at the time of the event had already expired on 2<sup>nd</sup> April, 2019. Additionally, he is a holder of a Radio Telephony License.

At the time of the accident, the total hours on the pilot license exceeded 13,100 hours and he had accumulated a total of 7 hours 20 minutes on the Cessna 206 aircraft.

The following ratings were found on his Airline Transport Pilot's License;

# **Types in Group 1**

- 1. PA 31/32
- 2. C150/152/172
- 3. PA 34
- 4. C 182
- 5. BE 200
- 6. JS 32
- 7. BE 55/58

8. BE 1900C/D
9. C 401/402
10.LET 410
11.BE 90

# **Types in Group 2**

- 1. ATR 42
- 2. BE 33A
- 3. B737

### **1.3 Aircraft Information**

The Cessna U206, Registration number 9J-RHE, MSN U206-1033 has the following Technical specifications;

### Exterior

- Exterior Height: 9 ft 4 in (270cm)
- Wing Span: 36 ft 0 in (1097cm)
- Length: 28 ft 3 in (861cm)

#### Interior

Cabin Volume: 102 cu ft

### Occupancy

- Crew: 1
- Passengers: 5

### **Operating Weights**

- Max T/O Weight: 3600 Lbs (1,634 kg)
- Max Landing Weight: 3600 Lbs (1,634 kg)
- Operating Weight: 2116 lbs (960kg)
- Fuel Capacity: 552 lbs(250kg)
- Payload W/Full Fuel: 932 lbs (423kg)
- Max Payload: 1484 Lbs (637kg)

### Range

• Service Ceiling: 15700 ft (4,785m)

#### Distances

- Balanced Field Length: 1780 ft (543m)
- Landing Distance: 2358 ft (719m)

#### Performance

- Rate of Climb: 920 fpm(280m/min
- Max Speed: 156 kts (288km/h)
- Normal Cruise: 147 kts (272km/h)
- Economy Cruise: 117 kts (216km/h)



# **Power Plant**

- Engines: 1
- Engine Manufacturer: Continental
- Engine Model: IO-520
- Total Time Run: 1991.45 hours
- Time since Complete overhaul: 287.55 hours

# Propeller

- Make: Hartzel
- Type: PHC3YF
- Total time run: 551 hours 15 minutes
- Date fitted: 07/2016

# 1.4 Injuries to Persons

No one on board or outside the aircraft was reported to be injured.

# 1.5 Damage to the Aircraft

The aircraft suffered a detached baggage pod, ripped belly skin and broken nose landing gear strut. The torque links detached at the attachment to the strut while the body- to - strut link also broke off from the oleo strut (Fig.1).

The lower skin aft of the engine cowling ripped off exposing the main frame structure as it slid along the airfield centerline (Fig.2).

The three propeller blades were bent backwards on impact with the ground as it was evident by the ground marks that the engine was still running on impact with the ground and during the initial stages of the slide on its belly (Fig.3).

The nose gear wheel bearings and sleeve were loose while the tire remained inflated. The Axle bolt, showed signs of corrosion, and was detached from the nut and evidence showed that there was no split pin prior to the nose wheel detaching from the fork. It was bent a quarter way from the head, with scratch marks resulting from it pulling out of the sleeve (Fig.4).

The axle bolt and the spacer between the fork- to- shock strut attachment showed clear signs of corrosion (Fig.4).

The body to wing attachment area fairing strips had a couple of screws missing or loose on both the Right-Hand Side (RHS) and Left-Hand Side (LHS) wing root area (Fig.5a and Fig.5b).

The side-lining panel around the bottom forward LHS corner was broken just aft of the entry door (Fig.6)

The aircraft was assessed as repairable, subject to results of a Non-Destructive Test (NDT) and other structural inspections.

# **1.6 Meteorological Information**

At Shiwangandu, no meteorological information was provided to the pilot. Actual weather as reported by the pilot was clear sky with strong winds.

# 1.7 Aids to Navigation

There were no aids to navigation at Shiwangandu

# 1.8 Aerodrome Information – Shiwangandu Airstrip

Shiwang'andu airstrip is located south east of the Manor House at latitude south 11° 12' 05.7" and longitude East 031° 44' 46. 1". There is one hard surface dust airfield 08/26 at a published average elevation of 1,490m. The terrain continues to rise north east but was assessed as being within the 2% tolerance. Besides the airfield side white markers and wind soak, there are no other visual landing aid facilities.

The air field had no Navigation aids and landing was purely on Visual Flight Rules (VFR).

Radio contact is absent below 10, 000 feet above sea level at this airfield.

# 1.9 Flight Recorders

The Cessna U206 is not equipped with a flight data recorder and voice recorder.

# 1.10 Wreckage and Impact Information

The aircraft first impacted the ground approximately in the second marker area, bouncing three times before the last impact that the oleo fork made with the ground in the fourth marker area.

The larger portion of the airframe structure and all wings and flight control surfaces were intact. There was no evidence of detachment of the wings or flight controls prior to or after the impact. The lower and upper skin on the wings was neither warped nor twisted and the rivets too, were undisturbed all along the upper, sides and lower fuselage structure. No evident damage was sighted on the empennage and rear fuselage area. The impact damage was mainly on the nose oleo strut and the baggage pod area, underneath of which the lower skin was ripped open during the skid following the breakage of the oleo strut and detachment of the fiber glass baggage pod (Ref to Fig.7)

Evidence collected on the wreckage indicates that there was no safety split pin to hold the axel bolt nut. Search on the runway and proximity of the wreckage were unsuccessful. The split pin was then most likely not in place at the time of departure.

The first officer's and Pilot in Command (PIC) instruments were visually intact.

# 1.11 Fire

There was no evidence of post-crash fire.

# 1.12 Survival Aspects

All on board survived the accident without any injuries at all and safely disembarked from the aircraft.

# 1.13 Examinations (Tests and Research)

No tests or research were conducted at the time of producing this report as the aircraft was still marooned on the side of the airfield where it was moved to clear for incoming and outgoing traffic.

The cockpit was critically analyzed and the throttle controls and fuel lever were in the normal and off position. The aircraft had sufficient fuel at departure and still had fuel in the tanks after the crash.

# 1.14 Organization and Management

# **Pertinent Information**

The pilot was 65 years and 8 months old at the time of the accident while in command of an aircraft requiring a single pilot for revenue flight and was the only pilot on board. The Pilots medical certificate had expired on 02/04/2019 according to the medical certificate page found in the license. Records in the log book revealed that he had flown 7 Hours 20 Minutes on the type.

# 1.14.1 Maintenance Records

Some discrepancies have been found in course of the investigation on the Airframe log book. Namely on page dated 29.08.19, the total time is 1,165.20 while on page dated 01.06.19, the total time is 11,528.10 Hours.

# 1.15 Additional Information

The aircraft was flown by other pilots during the period of the Certificate of Airworthiness and had the following documents on board;

- a) Aircraft checklist
- b) Flight manual
- c) Insurance certificate- valid from 25<sup>th</sup> January, 2019 to 24<sup>th</sup> January, 2020.
- d) Certificate of Airworthiness valid until 14<sup>th</sup> January, 2020.
- e) Radio license valid until 31<sup>st</sup> March, 2020.
- f) Certificate of Registration
- g) Weight Schedule valid until 7<sup>th</sup> August, 2021.
- h) Technical Logbook
- i) Pilot license which had an expired medical certificate at the time of the accident.
- j) First Aid Kit
- k) Air Service Permit

An evaluation of the pilot's license revealed that he had no endorsement for the Cessna U206 or the group thereof.

- Analysis of the work pack records at base for the last check prior to the accident revealed a lapse in the maintenance of records as well as laxity in the supervision of unlicensed maintenance personnel.
- The Certificate of Maintenance was valid until 11,671.55 Airframe total hours or on 25<sup>th</sup> February, 2020 by Calendar time.
- The aircraft Certificate of Airworthiness was valid from August 16, 2019 until 15<sup>th</sup> August, 2020.
- The Certificate of Insurance was valid until 24<sup>th</sup> January, 2020.
- The Radio license was valid until 31<sup>st</sup> March, 2020.
- The weight Schedule was valid until 7<sup>th</sup> August, 2020.
- The Sky Trails AOC and OPS SPECS were valid until 11<sup>th</sup> June, 2020.
- The Aircraft is installed with a 3 bladed Hartzel propeller, TBO- 2,400 hours or 6 years, Type, PHC 3YF, Serial No. QG1178B, constructed in May, 2015 and accumulated hours (Total Time Run) 551 hours 15 minutes as at the last inspection (check II) carried out on 28<sup>th</sup> August, 2019.

# 2. ANALYSIS

Evaluation of the evidence obtained during the investigation of this accident indicates that the pilot did not comply with requirements of ZCARs part 2.2.1.7 (b) the operator did not make available the pilot records to the CAA before granting him a flight to operate.

Furthermore, the maintenance of records was not given sufficient attention as indicated in the Airframe log book page dated 29.08.19 where the total time is 1,165.20 and Airframe logbook page dated 01.06.19 where the total time is 11,528.10 Hours.

# 3. CONCLUSION

Based on the elements gathered in the course of the investigation, the AAIB concludes that the accident was due to collapse of the nose landing gear. Contributing factors to this event are most likely identified in:

- hard landing in presence of strong wind
- gaps in maintenance

Latent factors found in this investigation are related to the operator quality assurance and oversight in association to the findings of the lack of pilot licensing requirements (age, rating and medical certificate).

# 4. SAFETY RECOMMENDATIONS

To CAA

AAIB/SR/2022/001

The ZCAA is recommended to promote attention to all operators and pilots to ZCARs Part 8 and subpart 8.4.1.11 (a) (4). It must be reminded that the above requirement if adhered to will reduce accidents and incidences of this nature.

AAIB/SR/2022/002

The ZCAA is recommended to ensure that Pilots Licenses and Log books are timely handed over to Personnel Licensing of CAA for procedural determination when they expire.

### AAIB/SR/2022/003

The ZCAA is recommended to carry out regular ad-hoc audit of Sky Trails to ensure that their policies and procedures meet adequate safety standards to deserve the continuation of the AOC.

To Sky Trails Limited

AAIB/SR/2022/004

Sky Trails Limited is recommended to revise and improve their Quality Assurance system to avoid the reoccurrence of the findings highlighted in this investigation. AAIB/SR/2022/005

Sky Trails Limited is recommended to improve the record maintenance of the Aviation Maintenance Organisation (AMO) and follow their Manual of Procedures in the performance of Maintenance activities.



Fig.1: Final Resting Position of Aircraft





Fig.2: Lower Engine Cowling



Fig.3: Bended Propeller Blade



Fig.4: Corroded Parts of Landing Gear



Fig.5a: Right Hand Side Wing Root



Fig.5b: Left Hand Side Wing Root



Fig.6: Side Trim Aft of Door Entry



Fig.7: Baggage Pod Area