

MINISTRY OF COMMUNICATIONS & WORKS

ACCIDENT INVESTIGATION BRANCH

CIVIL AIRCRAFT ACCIDENT NO. CAU/ACC/1/87

REPORT ON THE ACCIDENT TO PIPER PA 31 NAVAJO
AIRCRAFT REGISTRATION 5H-ILS
WHICH OCCURRED ON FEBRUARY 11TH 1987
AT ARUSHA AIRPORT, TANZANIA
(3° 20'S, 36° 37'E)

AIRCRAFT ACCIDENT NO.CAV/ACC/8/1987

AIRCRAFT TYPE : Piper PA31 Navajo
NATIONALITY & REGISTRATION : 5H-ILS
ENGINES : Two Lycoming TIO 540
REGISTERED OWNER : Directorate of Civil Aviation,
P.O. Box 2819,
Dar es Salaam,
TANZANIA
OPERATOR : Same as Registered Owner
PILOT : Two : UNINJURED
PASSENGERS : NIL
PLACE OF ACCIDENT : Arusha Airport,
Tanzania (3⁰20'S, 36⁰37'E)
DATE & TIME : February 11, 1987 at 05.40 hours

ALL TIMES IN THIS REPORT ARE UTC

SYNOPSIS

The aircraft had just been towed from the hangar to the apron for a training flight. The trainee was supposed receive type-rating instructions. Just before starting the engines, the trainee (who was alone in the cock pit) noticed that the gear lever was in the "UP" position. He returned it to the "NEUTRAL" position. When the port engine was started and was doing about 1,000 revolutions per minute, a landing gear horn was heard and the aircraft nose leg retracted. The main gear doors also opened but the main gear remained up. The aircraft sustained damage to all the blades of the port propeller, one blade on the starboard propeller and the nose gear doors.

Physical and dimensional check on the engines revealed no internal damage.

1. FACTUAL INFORMATION

1.1 History of the Flight

The aircraft was scheduled to do a type-rating flight on the morning of February 11, 1987. It was parked overnight in the company hangar at Arusha and was towed to the apron at about 05.15 hours. The trainee conducted the pre-flight checks on the apron. The training captain was inside the aircraft trying to lock the back door when the trainee, who was by then in the cockpit, noticed that the undercarriage lever was in the "UP" position. He returned it to the "NEUTRAL" position. When the port engine was

started and was doing about 1000 revolutions per minute, a gear warning horn came on. The pilot checked the circuit breakers and found all were in the "IN" position. He subsequently noticed that the aircraft had started to sink nose down. He immediately switched off the magnetoes and the master switch. The nose leg collapsed and the two propellers hit the ground. The main gear doors opened but the main gear itself remained down. The port propeller which was turning on impact, had all its blades bent. The starboard propeller had only one blade slightly bent.

1.2 Injuries to Persons

| INJURIES | CREW | PASSENGERS | OTHERS |
|----------|------|------------|--------|
| FATAL | - | - | - |
| SERIOUS | - | - | - |
| NONE | 2 | - | - |

1.3 Damage to Aircraft

The port propeller had all its three blades bent. The starboard propeller had slight bend on one blade. There was damage to the nose gear doors.

1.4 Other Damages

There was slight damage to the concrete pavement caused by the propeller strike.

1.5 Personnel Information

- (a) The commander was born at Moshi, Tanzania on September 24th, 1952. He held an Airline Transport Pilot's Licence NO.HP 127 granted on July 22th, 1985. He also held a Radio Telephony operators' Licence No.H-493 issued on March 3rd, 1984.

He had the following ratings to his licence.

Group 1 ; PA 18, PA23; PA31 and PA 34

Group 2; HS - 748

Flying Experience

The commander had an experience of 4,700 hours as P1 broken down as follows:-

Day 4550 hours

Night 150 hours

- (b) The trainee pilot was born at Mwanza, Tanzania on December 18th, 1955. He held a Commercial Pilots Licence No. HP 240 which was granted on February 18th, 1984. It had since been kept valid. By the time of the accident it was valid till September 5th, 1987. He also held a flight Radio Telephony Operator's Licence No. H-491 granted on February 18th, 1984.

He had the following ratings to his Licence:

Group I : Cessna 172, Piper PA 23, Cessna 210

Group II : Cessna 310

Flying Experience

At the time of the accident he had a total experience of 950 hours broken down as follows:-

P1 : 820 hours

P2 : 130 hours

1.6 Aircraft Information

The aircraft, a Piper PA-31-325 Navajo Serial No. 31-8112055 powered by one Lycoming TIO-540-F28D and one LTIO-540-F28D engines was manufactured by the Piper Aircraft Company at Lock haven, Penny slvania, USA, in Norway as LN-PIH but changed to 5H-ILS on June 7, 1982 in the name of Tanzania Electrical Goods Manufacturing Ltd. The ownership was changed to Directorate of Civil Aviation on September 3, 1986. The aircraft was granted a local Certificate of Airworthiness No. 228 on June 19th, 1982 which has since been kept current. By the time of the accident, the C of A was valid till June 5th, 1987.

1.6.1 Loading and C of G disposition

Not applicable.

1.7 Meteorological Information

It was bright sunny day. The weather had no bearing on this accident.

1.8 Aids to Navigation

Not Applicable

1.9 Communications

Not applicable

1.10 Aerodrome Information

Not applicable.

1.11 Flight Recorders

Not required by regulations : None fitted.

1.12 Wreckage

All the damage observed on the propellers and the nose gear doors was attributable to the impact with ground.

1.13 Medical and Pathological Information

Not applicable

1.14 Fire

There was no fire.

1.15 Survival aspect

This was a survivable accident.

1.16 Tests and Research

The aircraft was returned to the hangar for further examination of the gear retraction mechanism in order to determine the reason why the gear lever was in the "UP" position when the gear was actually down.

Examination of the landing gear selector unit showed that the spring-loaded armature which acts as a lever solenoid switch had its contact pin end dented and bent. This pin end, when extended, acts as a gear lever stop. It was observed that, at times, the spring force was incapable of moving the bent armature pin end to the lever "STOP" position.

The circumstances in which the armature was bent could not be ascertained. It was evident however, that a big load had been applied to the gear lever with the armature pin end engaged causing it to bend.

2. ANALYSIS

Examination of the aircraft records revealed no reported defects to the landing gear mechanism. The pilot also did not suspect anything seriously wrong with the mechanism when he found the gear lever in the "UP" position.

In the sequence of engine start the pilot has to take the gear lever to the "DOWN" position and the lever should automatically return to the "NEUTRAL" position. The pilot reported to have done this operation successfully. One eye witness remembered to have seen the gear lever in the "UP" position shortly before the accident. In any case there was subsequently no time for the pilot to concentrate on monitoring the position of the gear lever since he was then busy starting the engines.

The damage to the armature pin consisted of a bend and two dents which would suggest that it had possibly been subjected to impact loading. This loading should have been applied through the gear lever. The circumstances under which this loading had been applied could not be ascertained.

3. CONCLUSIONS

(a) Findings

1. The pilot was properly qualified to undertake the flight.
2. The aircraft documents were in order.
3. The pin-end of the landing gear solenoid switch was dented and bent. In the circumstances, this made it possible for the nose gear to retract while the aircraft was on the ground.

- (b) The accident was caused by the retraction of the landing gear when the aircraft was standing on the ground. This retraction was made possible by a defective solenoid switch.