AIRCRAFT ACCIDENT SHORT REPORT

CA18/2/3/9829: The left undercarriage collapsed during the landing roll.

Date and time	: 11 October 2019 at 0605Z
Aircraft registration	: ZU-MJB
Aircraft manufacturer and model	: Alpi Aviation SRL, Pioneer 330
Last point of departure	: Krugersdorp Aerodrome (FAKR), Gauteng Province
Next point of intended landing	: Krugersdorp Aerodrome (FAKR), Gauteng Province
Location of incident site with reference to easily defined geographical points (GPS readings if possible)	: FAKR S26°04'51.52" E027°43'32.40'' Elevation 5499 feet.
Meteorological information	: Surface wind: 090°at 7knots, Temperature: 15°C
Type of operation	: Private
Persons on-board	: 1+0
Injuries	: 0
Damage to aircraft	: Left-side undercarriage, and the left-side wing

All times given in this report are Co-ordinated Universal Time (UTC) and will be denoted by (Z). South African Standard Time is UTC plus 2 hours.

Purpose of the Investigation:

In terms of Regulation 12.03.1 of the Civil Aviation Regulations (2011), this report was compiled in the interest of the promotion of aviation safety and the reduction of the risk of aviation accidents or incidents and ***not to apportion blame or liability.***

Disclaimer:

This report is produced without prejudice to the rights of the South African Civil Aviation Authority (SACAA), which are reserve.

1. SYNOPSIS

1.1 On 11 October 2019 at approximately 0600Z, the pilot took off on a private flight from Jack Taylor Krugersdorp Aerodrome (FAKR) in Gauteng province with the intention to practise touch-and-go landing exercises. The aircraft was operated under the provisions of Part 91 of the Civil Aviation Regulations (CAR) 2011 as amended.

1.2 The pilot stated that after touch down on Runway 08 and during the landing roll, the left main undercarriage collapsed, and the left wing came into contact with the ground. The aircraft veered off to the left of Runway 08 and came to rest approximately 5 metres away from it (runway).

1.3 The aircraft sustained substantial damage to the left undercarriage, left wing and the underbelly. The pilot was not injured during the accident sequence.

1.4 The investigation revealed that the main landing gear was fully extended during landing, however, the jacks that operate over the centre mechanism which lock the landing gear could not lock because of the broken lock pin in the undercarriage gearbox. This resulted in the left main undercarriage collapsing after touch down.

2. FACTUAL INFORMATION

2.1 History of flight

2.1.1 On 11 October 2019 at approximately 0600Z, the pilot took off on a private flight from Jack Taylor Krugersdrop Aerodrome (FAKR) in Gauteng province with the intention to practise circuit training exercises. The pilot stated that after touch down during the landing roll, the left undercarriage collapsed and the left wing came into contact with the ground. During the landing roll, the aircraft veered off to the left of Runway 08 and came to rest approximately 5 metres away from it (runway).

2.1.2 The accident occurred during daylight at FAKR at Global Positioning System (GPS) co-ordinates determined to be S26°04’51.52” E027°43’32.40’’ at an elevation of 5499 feet (ft).

2.1.3 Fine weather conditions prevailed at the time of the accident.

2.1.4 The aircraft had a certificate of registration (CoR) which was issued on 7 August 2018. The aircraft also had a valid authority to fly which was issued on 19 August 2019, with an expiry date of 31 August 2020. The last annual inspection was carried out on 6 August 2019 at 591.6 hours (recorded tachometer). The certificate of release to service (CRS) was issued on 25 April 2019. The aircraft had flown a total of 38.1 hours since its last annual inspection. According to the aircraft documentation, the maintenance was conducted as per the manufacturer’s maintenance program and there were no recorded snags prior to the accident.

Figure 1: The aircraft as it came to rest after the accident.

2.1.5 The Pioneer 330 aircraft's wing skin is fully made of plywood, working in accordance to the flight loads. The retractable landing gear is equipped with a gas-oil damper system offering comfort when taxiing, taking-off and landing.

2.1.6 The aircraft is fundamentally of wooden construction and features a retractable tricycle landing gear. Retraction and extension is through an electric motor which drives three screw jacks (one for each landing gear). When the legs are fully extended, the jacks operate over the centre mechanism which lock the landing gear down. If the electric motor fails for any reason, a hand crank can be used to drive the mechanism manually. The indications for the landing gear are conventional. Three green lights illuminate when the landing gear is down and locked; and the amber light indicates that a landing gear is in transit or unsafe to retract or to extend.

2.1.7 After the accident, the main landing gear gearbox was recovered and it was found that the centre lock pin had broken off and had become disabled, causing the left main landing gear to collapse. The lock pin was never recoverded from the accident site.

Figure 2: The aircraft's undercarriage gear box.

Figure 3: Picture of the lock pin hole.

2.1.8 Additional information: Source: PIONEER 300 MAINTENANCE PROGRAM REV. 02 15/05/07

2.1.8.1 MAIN LANDING GEAR 25 hours inspection

Check bolts & nuts fastening and the bracket aft placed the pivot (Picture 11)

Check greasing

Check tightening of the screws onto landing gear knee pivot

Check electrical end stroke

Check tightening of brake-disk

Check wheel pivot tightening (both onto leg and onto whell rim)

Brake oil level

Wheel pressure (2,2 bar)

2.1.8.2 MAIN LANDING GEAR 100 hours inspection

Greasing of the rotation pivot and knee one

(compulsory to grease every 6 months)

2.1.8.3 MAIN LANDING GEAR 200 hours inspection

MAIN LANDING GEAR

Greasing the rotation pivot and the L/G knee

(compulsory to grease every 6 months)

2.1.8.4 MAIN LANDING GEAR 300 hours inspection. All checks as described per 200 hours inspection

Replacement of main L/G Wheels

Replacemen brake-lining

2.1.8.5 MAIN LANDING GEAR 400 hours inspection

Repeat all inspection as per 200 hiurs inspection.

2.1.8.6 MAIN LANDING GEAR 500 hours inspection

All checks as described per 100 hours inspection

Replace shock-absorber plug, spring and nut

Rotate the leg knee pivot to 90° and replace all nuts

Complete dismounting of the L/G and check the rotation pivot wear

Replace wheel pivot and bolts & nuts

Replace wheel bearing

Retraction: RETRACTING GROUP

All checks as described per 100 hours inspection

Replace actuator belt

Replace motor retraction brushes

NOTE: *Tubes must be replaced every three years also if the aircraft did not complete the hours and after one year if the aircraft did not fly.*

NOTE 2: *Maintenances after that of the 500 hours is cyclic, starting from the 100 hour check up. After 2000 flying hours, the aircraft must be carefully inspected by the factory, keep in contact with the dealer or the factory directly to undertake t inspection and the maintenance.*

NOTE 1: *For proper operation of all movements and kinematics, electrical equipment, hydraulic and fuel circuits, it is recommended that the aircraft does at least one flight per month and that its engine is started every week. When the aircraft remains stationary for more than one month, repeat the 25 hours check and testing.*

According to the Aircraft Doc. No. 3FM-S-R100-V-UK-EN-SA Pioneer 300 S Flight Manual 4.3.5 Retractable Gear Malfunctions (Hand Operation of U/C**)**

1 *Gear breaker OUT (OFF)*
2 *Gear switch OFF (DOWN)*
3 *Take handle from box Inset in central hole between seats*
4 *Operation Turn about 40 times up to the stop*.
Note*: After hand operated extension, continue to next airport and inspect.*

In the event of Gear UP being selected accidentally on the ground –

 If the aeroplane is stationary, the gear circuit breaker will operate and prevent the undercarriage from retracting. Note: if the aeroplane is moving on the ground, this protection may not apply and the undercarriage may retract.

 Re-select Gear DOWN, push in the circuit breaker, and check for 3 greens.

3. Findings

3.1 The pilot was issued a Private Pilot Licence (PPL) on 30 May 2019 with an expiry date of 31 May 2020. The pilot was properly rated on the aircraft type prior to the accident. The pilot was issued a valid medical certificate on 30 May 2019 with an expiry date of 31 May 2020.

3.2 The pilot had flown a total of 82.7 hours and had a total of 36.2 hours on the aircraft type.

3.3 The annual inspection was carried out on 6 August 2019 at 591.6 airframe hours. The aircraft had a total of 629.7 airframe hours at the time of the accident. The aircraft had flown a total of 38.1 hours since its last Mandatory Periodic Inspection (MPI). The certificate of release to service (CRS) was issued on 25 April 2019.

3.4 After the accident, several tests were conducted for fault finding on the brakes system, and no anomalies were detected.

3.5 According to available maintenance records, the aircraft was maintained in accordance with the manufacturer's prescribed maintenance program (Pioneer 300 Maintenance Program). There were no recorded or reported defects on the landing gear maintenance and inspection in the flight folio annual inspection work pack and the aircraft logbooks provided by the aircraft maintenance organisation (AMO).

3.6 During the investigation, it was established that the maintenance and inspection on the gearbox was not covered in the manufacturer's maintenance program (Pioneer 300 Maintenance Program) for the aircraft type Pioneer 330 on all the maintenance inspections conducted on the undercarriage gearbox.

3.7 The aircraft was operated under the provisions of Part 24 of the Civil Aviation Regulations (CAR) 2011 as amended.

3.8 Weather conditions were fine at the time of the occurrence. The weather was not a contributory factor to the accident.

3.9 The aircraft had a valid authority to fly which was issued on 19 August 2019 with an expiry date of 31 August 2020. The aircraft had a certificate of registration (CoR) which was issued on 7 August 2018.

3.10 After the aircraft had landed, the left-side undercarriage collapsed, as a result, the aircraft veered off to the left of Runway 08.

3.11 The main landing gear was fully extended during landing, however, the jacks that operate over centre mechanism which lock the landing gear could not lock because of the broken lock pin in the undercarriage gearbox. This resulted in the left main undercarriage collapsing after touch down.

4. PROBABLE CAUSE/CONTRIBUTING FACTOR

4.1 The main landing gear was fully extended during landing, however, the jacks that operate over centre mechanism which lock the landing gear could not lock because of the broken lock pin in the undercarriage gearbox. This resulted in the left main undercarriage collapsing after touch down.

5. REFERENCES USED IN THE REPORT

5.1 Extract of P330 Flight Manual - Section 4.3.5 Retractable Gear Malfunctions (Hand Operation of U/C)

5.2 Extract of P330 Building Manual delivered with the kit – Chapter 7 Mounting of gear retraction system

5.3 Maintenance program Pioneer 330

5.4 Owners and pilot questionnaires

5.5 Aircraft logbooks and flight folio

6. SAFETY RECOMMENDATION

6.1 After the accident, the AIID had established that the maintenance and inspection of the gearbox was not covered in the manufacturer's maintenance program (Pioneer 300 Maintenance Program) for the aircraft type Pioneer 330 on all maintenance inspections conducted on the undercarriage gearbox. It is, therefore, recommended that the aircraft manufacturer, the Italy agent and Italy CAA come up with the maintenance program that will include the inspection of the landing gear gearbox.

7. ORGANISATION

7.1 None.

8. APPENDICES

8.1 Appendix 1.

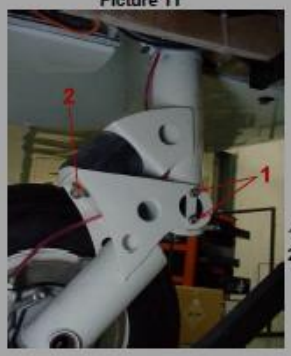
This Report is issued by:

Accident and Incident Investigations Division
South African Civil Aviation Authority
Republic of South Africa

Appendix 1: Main landing gear

3-MP-A-A-A-A-EN Maintenance programm P300 - Pioneer 300

Picture 11



1 rotation pivot screws
2 plug pivot screw

Picture 12

1 main landing gear end stroke

Picture 13

1 booster pump
2 remove the pipe (tube), inside you find the filter

Picture 14

1 nose L/G spring and plug