SOUTH AFRICAN CIVIL AVIATION AUTHORITY

Section/division **Accident and Incident Investigations Division** Form Number: CA 12-57

LIMITED ACCIDENT INVESTIGATION REPORT

Reference Number	CA18/2/3/10073				
Classification	Accident	**Date**	11 November 2021	**Time**	1250Z
Type of Operation	Training (Part 141)				
Location					
Place of Departure	Wonderboom Aerodrome (FAWB), Gauteng Province	Place of Intended Landing	Wonderboom Aerodrome (FAWB), Gauteng Province		
Place of Occurrence	Runway 29, Wonderboom Aerodrome (FAWB), Gauteng Province				
GPS Co-ordinates	Latitude	25º 39' 15.37" S	Longitude	028º 13' 36.85" E	Elevation	4 078ft
Aircraft Information					
Registration	ZS-CZU				
Model/Make	Piper PA-28-180 Cherokee (Serial Number: 28-971)				
Damage to Aircraft	Substantial	Total Aircraft Hours	3 693.9		
Pilot-in-command					
Licence Valid	Yes	Gender	Male	Age	19
Licence Type	Student Pilot Licence (SPL) Aeroplane				
Total Hours on Type	23.5	Total Flying Hours	23.5		
People On-board	1 + 0	Injuries	0	Fatalities	0	Other (on ground)	0

What Happened

On 11 November 2021 at 1230Z, a student pilot (SP) and a flight instructor (FI) on-board a Piper PA-28-180 Cherokee aircraft with registration ZS-CZU departed Runway (RWY) 29 at Wonderboom Aerodrome (FAWB), Gauteng Province, on a training flight with the intention to land at the same aerodrome. The flight was conducted under visual flight rules (VFR) by day and no flight plan was filed.

After take-off from RWY 29, they completed three touch-and-go landing exercises, and no anomalies with the aircraft were noted. After the fourth circuit, the SP executed a full stop landing and the aircraft was taxied to the terminal building parking area where the FI disembarked the aircraft. After the SP had made sure all was clear around the aircraft, he taxied back to RWY 29 threshold where after he took off on a solo consolidation flight. According to the SP, the first touch-and-go landing was uneventful; he then took off for a second circuit with no anomalies noted.

The SP stated that touch down on RWY 29 during the second touch-and-go landing was normal until he tried to add power to gain speed and take-off for the third circuit when he felt the nose wheel shimmy violently. He immediately cut off power and, during that time, he lost directional control as he tried to get the aircraft back to the centreline. The aircraft veered off to the left-side of RWY 29. The nose landing gear's steering tube assembly broke off after exiting the asphalt runway edge, and

the propeller struck the ground before the aircraft stopped approximately 15 metres (m) from the runway edge. The aircraft was substantially damaged, and the SP did not report any injuries.

According to the eyewitness, the aircraft flared too high and subsequently lost forward speed, stalled, and impacted the runway surface very hard with the nose gear before veering off to the left of the runway.

Figure 1: The aircraft as it came to rest with the propellers bent due to ground impact. (Source: Operator)

Figure 2: Close-up view of damages on the lower cowling and propellers.

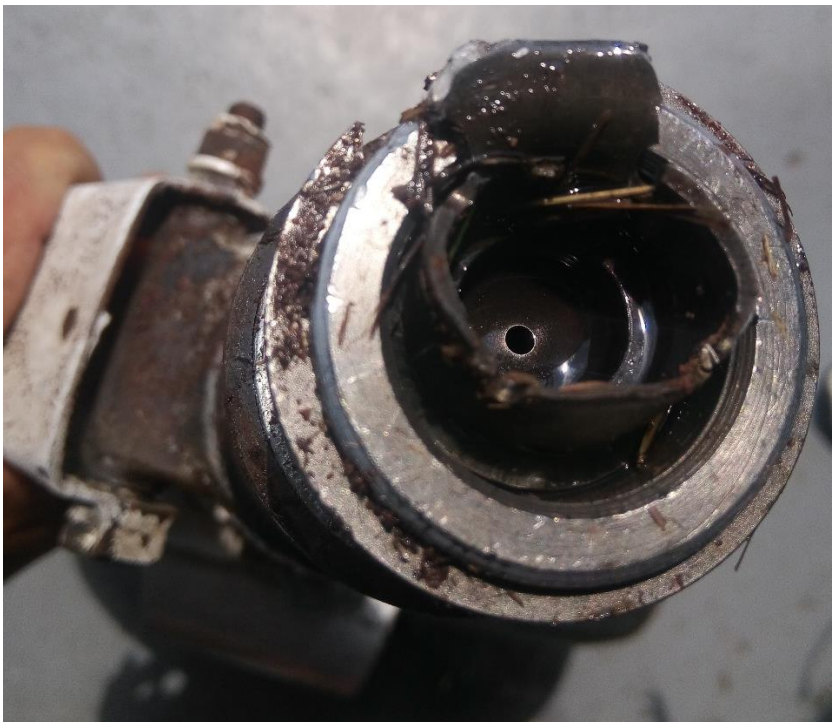

Figure 3: Close-up view of the damaged nose gear steering tube assembly.

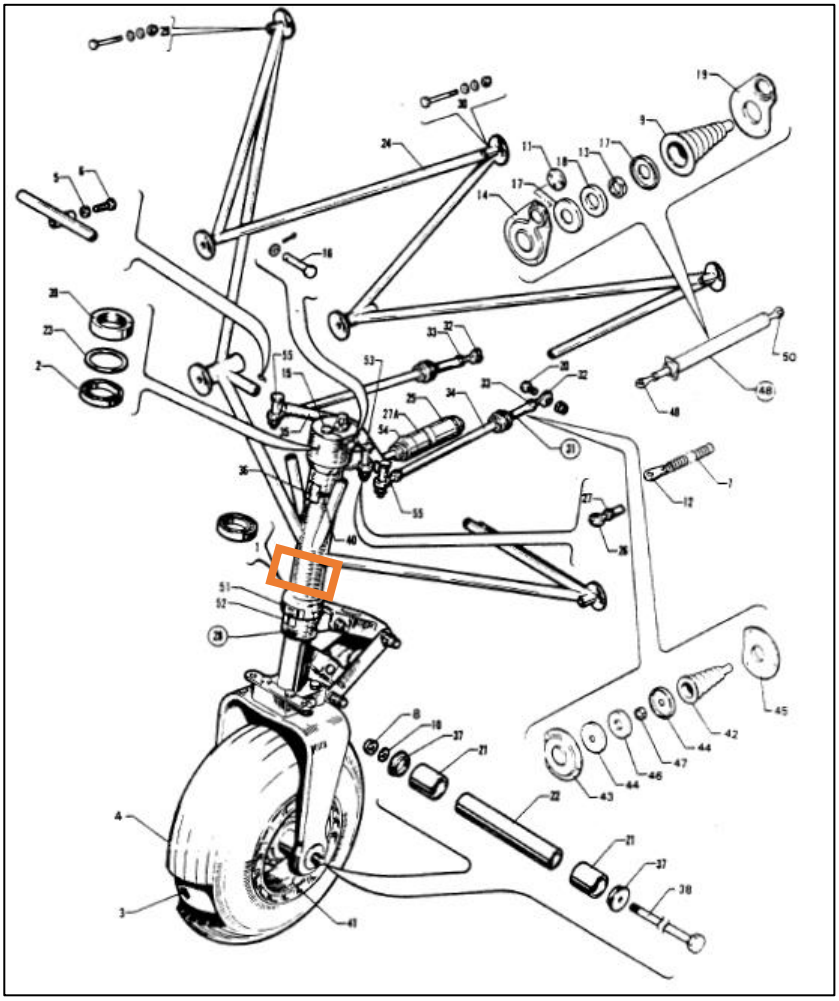

Diagram 1: Schematic of the nose gear. The orange window shows the area or separation/failure at the upper nose steering tube assembly due to impact. (Source: Piper PA-28-180 Parts Catalogue)

Post-accident investigation revealed the following findings:

- Examination of ZS-CZU's flight folio indicated no outstanding defects that required rectification relating to the aircraft's steering control and/or braking mechanism prior to the accident.
- Before the SP flew his solo consolidation circuits, he had completed three circuits with a flight instructor on-board, during which three landings were completed with no incidents.
- On 14 September 2021, another SP had a similar occurrence while flying ZS-CZU. After three touch-and-go landings that were performed with a flight instructor before the SP flew solo, the SP veered-off the runway during the first landing, and attributed the cause to shimming of the nose wheel experienced during landing. However, the SP had not recorded the defect in the defect report section when the flight folio was inspected by investigators on 25 October 2021; 41 days after the incident was reported.

  In the absence of the (above) reported defect and that no rectification to any defect relating to the nose gear was carried out following that incident, the investigation concluded that the SP lost directional control of the aircraft due to an unstable approach for landing.
- According to the flight folio, at the time of the accident involving the ZS-CZU that occurred on 11 November 2021, the aircraft had accumulated 3693.9 hours and had flown 52.95 hours since the last incident during which the SP lost directional control.
- According to the latest Certificate of Release to Service (CRS) issued for ZS-CZU, the aircraft's last mandatory periodic inspection (MPI) was carried out on 19 August 2021 at 3 597.80 hours. At the time of the accident, the aircraft had accumulated 3 693.9 hours and had flown 96.1 hours since the MPI.
- The last MPI was carried out by an aircraft maintenance organisation (AMO) with a valid approval certificate. The aircraft maintenance engineer (AME) who carried out the last MPI was appropriately licensed to carry out maintenance on the aircraft type.
- According to the operator, there is no record of hard landings reported in their safety management system (SMS) database for ZS-CZU aircraft.
- According to the AMO's damage report for ZS-CZU's post-accident inspection, the following items or components were found damaged or needed inspection:
  - Propeller was completely damaged and needed replacement.
  - Engine was due for shock load inspection.
  - Engine cradle was bent and cracked, and the lower part of oleo collar had completely broken off.
  - Nose gear oleo outer steering tube was completely torn out of the engine cradle's lower section, no damage to nose gear fork.
  - Damage to firewall.
  - Damage to carburettor heat box and air intake box.
  - Damage to lower cowling and nose cone.
- It is likely that the violent nose wheel shimmy felt by the SP during the landing roll was due to the torn nose gear oleo outer steering tube, which broke off after exiting the asphalt runway edge.

Probable cause:

It is likely that the aircraft was unstable on approach, resulting in the aircraft landing on its nose wheel first, which broke off; the aircraft lost directional control and veered off to the left of the runway.

Safety Action(s)
None.
Safety Message
(1) Training school to ensure that pilots log occurrences in the flight folio and report them through the school's SMS programme.
Purpose of the Investigation
In terms of Regulation 12.03.1 of the Civil Aviation Regulations (CAR) 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****.*
About this Report
Decisions regarding whether to investigate, and the scope of an investigation are based on many factors, including the level of safety benefit likely to be obtained from an investigation. For this occurrence, no investigation has been conducted, and the Accident and Incident Investigations Division (AIID) has relied on the information submitted by the affected person/s and organisation/s to compile this brief report. The report has been compiled using information supplied in the initial notification, as well as follow-up information to bring awareness of potential safety issues to the industry in respect of this occurrence, as well as possible safety action/s that the industry might want to consider in preventing a recurrence of a similar accident. *This report provides an opportunity to share safety message/s in the absence of an investigation.* *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.*
Disclaimer
This report is produced without prejudice to the rights of the AIID, which are reserved.

This report is issued by:

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