LIMITED OCCURRENCE INVESTIGATION REPORT – FINAL

Reference Number	CA18/2/3/10423										
Classification	Accident		**Date**	20 February 2024			**Time**	1420Z			
Type of Operation	Training Flight (Part 141)										
Location											
Place of Departure	Grand Central Airport (FAGC), Gauteng Province		Place of Intended Landing			Grand Central Airport (FAGC), Gauteng Province					
Place of Occurrence	Grand Central Airport (FAGC), Gauteng Province										
GPS Co-ordinates	Latitude	25°42'16"S	Longitude	27°49'33"E	Elevation	4 065 feet					
Aircraft Information											
Registration	ZS-LPM										
Make; Model; S/N	Piper; PA 34-220T (Serial Number: 34-8133133)										
Damage to Aircraft	Substantial			Total Aircraft Hours	5 430.1						
Pilot-in-command											
Licence Type	Airline Transport Pilot Licence (ATPL), Aeroplane			Gender	Male		Age	32			
Licence Valid	Yes		Total Hours	4 938.9		Total Hours on Type	37.3				
Total Hours 30 Days	24.5		Total Flying on Type Past 90 Days		3.1						
People On-board	2 + 0	**Injuries**	0	**Fatalities**	0	**Other (on ground)**	0				

What Happened

On 20 February 2024 at approximately 1150Z, an instructor and a student pilot on-board a Piper PA 34-220T Seneca III multi-engine aircraft with registration ZS-LPM took off on a training flight from Grand Central Airport (FAGC) in Gauteng province to Brits general flying area (GFA) in North West province with the intention to return to the same take-off airport. Visual meteorological conditions (VMC) by day prevailed at the time of the flight which was conducted under the provisions of Part 141 of the Civil Aviation Regulations (CAR) 2011 as amended.

According to the instructor, the flight was an introductory to multi-engine aircraft type for the student pilot. The crew took off from FAGC and routed north towards Brits GFA where they performed climb and descent exercises. Whilst flying at an air speed of approximately 120 knots (kt), the instructor directed the student pilot to move the landing gear lever to a “down” position in preparation for descent manoeuvre practise. The student pilot noticed that both the left and the right main landing gears were down and locked (as the green light indication illuminated for both gears), but the nose landing gear showed that it was not down and locked. The crew attempted to recycle the landing gear but were unsuccessful. They then decided to return to FAGC. Upon arrival at FAGC, they flew overhead the airport whilst in communication with the Aerodrome Rescue and

Firefighting (ARFF) personnel by phone. The crew requested the personnel to check the position of the nose gear, which they confirmed was retracted. The crew continued to conduct basic troubleshooting during which several attempts to lower the nose gear were made. They then decided to follow the emergency gear extension procedures as outlined in the Pilot's Operating Handbook (POH), but still with no success. The crew remained in the air for approximately 15 minutes to lower the nose gear by rocking the aircraft from side-to-side, and they were still unsuccessful. The crew then opted to land the aircraft with only the main landing gears extended. During the landing roll on Runway 35, the crew reduced the speed and switched off the engines before they lowered the nose (section). The aircraft skidded on its nose cone for approximately 239 metres before it stopped. The aircraft was substantially damaged, and none of the occupants was injured.

Figure 1: The aircraft's final position on the runway.

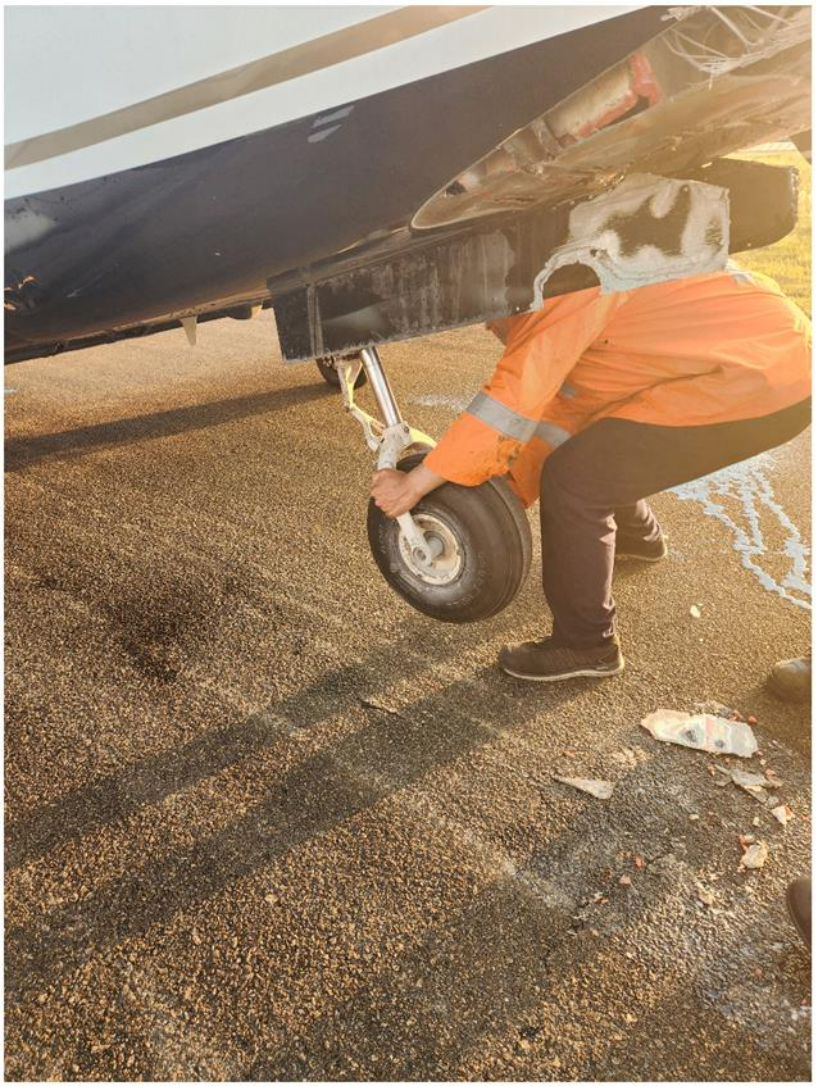


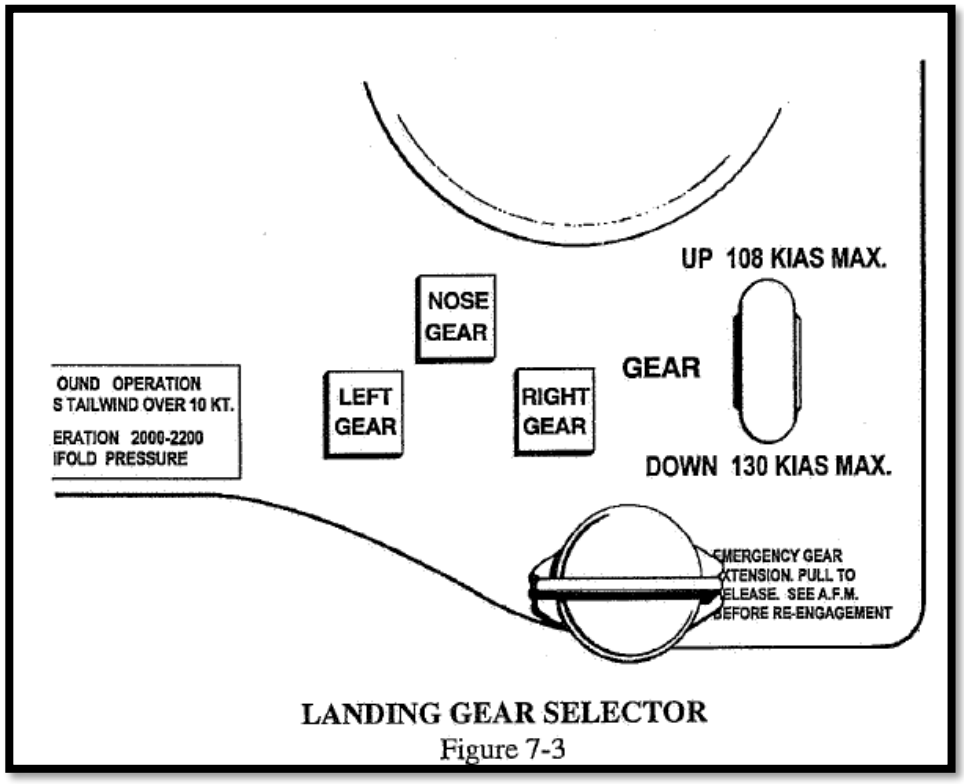
Figure 2: The nose landing gear during post-accident manual extension.

During the post-accident inspection, the aircraft's tail was pulled down towards the ground to lift the nose section off the ground. The aircraft maintenance engineer (AME) manually opened the nose gear doors and the nose landing gear extended and locked into position. The nose gear doors were damaged due to skidding on the runway. It could not be determined what could have caused them not to release (open).

The electrical wires that were damaged during landing were repaired, the landing gear was retracted and extended to test it, and it was serviceable. The emergency extension system was also tested and found serviceable. The tests were conducted without the nose gear doors fitted as the hinges were damaged during the landing roll.

The information below is an extract from the Seneca III PA-34-220T Pilot's Operating Handbook and Airplane Flight Manual Revised September 17, 1984:

The landing gear is designed to extend even in the event of hydraulic failure. Since the gear is held in the retracted position by hydraulic pressure, should the hydraulic system fail for any reason, gravity will allow the gear to extend. When the landing gear is retracted, the main wheels retract inboard into the wings and the nose wheel retracts forward into the nose section. Aerodynamic loads and springs assist in gear extension and in locking the gear in the down position. During gear extension, once the nose has started toward the down position, the airstream pushes against it and assists in moving it to the downlocked position. After the gears are down and the downlock hooks engage, springs maintain force on each hook to keep it locked until it is released by hydraulic pressure.



LANDING GEAR SELECTOR
Figure 7-3

To extend and lock the gears in the event of hydraulic failure, it is necessary only to relieve the hydraulic pressure. Emergency gear extension must not be attempted at airspeeds in excess of 85 KIAS. An emergency gear extension knob, located directly beneath the gear selector switch is provided for this purpose. Pulling this knob releases the hydraulic pressure holding the gear in the up position and allows the gear to fall free. During normal operation, this knob is covered by a guard to prevent inadvertent extension of the gear. Before pulling the emergency gear extension knob, place the landing gear selector switch in the "DOWN" position to prevent the pump from trying to raise the gear. If the emergency gear knob has been pulled out to lower the gear by gravity, due to a gear system malfunction, leave the control in its extended position until the airplane has been put on jacks to check the proper function of the landing gears hydraulic and electrical systems. See Aircraft Service Manual for proper landing gear system check out procedures. If the airplane is being used for training purposes or a pilot check out mission, and the emergency gear extension has been pulled out, it may be pushed in again when desired if there has not been any apparent malfunction of the landing gear system.

An Extract from the Special Airworthiness Information Bulletin (Source: SAIB CE-09-15, dated 2 March 2009)

Introduction

This Special Airworthiness Information Bulletin (SAIB) alerts you, owners, or operators, of all serial numbers of Piper Aircraft, Inc. (Piper) Models PA-34-200, PA-34-200T and PA-34-220T airplanes of an airworthiness concern and the potential failure of the nose landing gear to extend as a result of the bolt head becoming jammed against the aft tube assembly-nose gear door actuation. This failure is due to a hex-head bolt on the nose gear centering spring rod-end to the nose gear strut, coming in contact with the nose gear door actuation aft tube assembly. This action impedes/prevents the extension of the nose gear assembly.

At this time, this airworthiness concern is not an unsafe condition that would warrant AD action under Title 14 of the Code of Federal Aviation Regulations (14CFR) part 39.

Background

This SAIB is a result of an incident on a Piper Model PA-34-200 airplane that occurred during an approach to land in which the nose gear failed to extend. Post incident investigation revealed that the hex-head bolt on nose gear centering spring had come in contact with nose gear door actuation tube assembly. This action prevented the nose gear assembly from exiting the wheel well area in normal operations and during emergency procedures.

Piper had a similar problem several years ago which resulted in the publication of Service Bulletin (SB) No. 893 dated October 11, 1988. This SB recommended an inspection of the nose gear assembly to include replacement of the hex-head bolt with a clevis bolt and washers to prevent the nose gear failure. The Piper Model PA-34-220T airplane was certified after SB 893 was published; however, it has the same nose gear assembly. All S/N PA-34-220T aircraft should have the clevis head bolt installed at the factory but they should also be included.

Recommendations

The purpose of this SAIB is to provide information to reduce the possibility of failure to the nose gear. We recommend that you incorporate Piper Service Bulletin No. 893, dated October 11, 1988, which specifies inspecting the nose gear center spring assembly for proper bolt (replace the hex-head bolt with a clevis bolt) along with washer installations and proper alignment to centering bracket.

Findings

1. The instructor pilot was initially issued an Airline Transport Pilot Licence (ATPL) Aeroplane on 15 February 2017. The ATPL was renewed on 28 June 2023 with an expiry date of 30 June 2024. The instructor had both Instruments and Grade II flight instructor ratings endorsed on his licence. The instructor had a Class 1 aviation medical certificate that was issued by the SACAA on 16 February 2024 with an expiry date of 28 February 2025 with no restrictions. The instructor was medically fit to conduct the flight.

2. The student pilot was initially issued a Private Pilot Licence (PPL) Aeroplane on 4 September 2023 with an expiry date of 31 August 2024. The student pilot had a night rating endorsed on his licence. The student pilot had accumulated a total of 198.6 hours of which 2.5 hours were on the aircraft type. The student pilot had a Class 2 aviation medical certificate that was issued on 6 February 2023 with an expiry date of 28 February 2024 with no restrictions. The student pilot was medically fit to conduct the flight.

3. The flight was authorised to operate under the approved training organisation (ATO) with an ATO certificate that was issued on 10 September 2021 with an expiry date of 30 September 2026.

4. The last mandatory periodic inspection (MPI) on the aircraft was certified on 1 February 2024 at 5 427.0 aircraft airframe hours. The aircraft was issued a Certificate of Release to Service (CRS) on 1 February 2024 with an expiry date of 1 February 2025 or at 5527.0 airframe hours, whichever occurs first. The aircraft has flown a further 3.1 hours since the last inspection.

5. The aircraft had a valid Certificate of Airworthiness (C of A) that was initially issued on 28 November 2006. The C of A was last renewed on 16 November 2023 with an expiry date of 30 November 2024. The aircraft's Certificate of Registration (C of R) was issued to the current owner on 6 October 2022.

6. The aircraft maintenance organisation (AMO) which signed out the aircraft had a valid AMO certificate that was re-issued on 13 June 2023 with an expiry date of 31 July 2024.

7. The student pilot extended the landing gears to practise descent manoeuvres (exercises) and the nose gear failed to extend. The nose landing gear doors could not open during the landing gear extension and, therefore, the nose landing gear remained retracted.

8. There was a Special Airworthiness Information Bulletin (SAIB) number CE-09-15 which alerts owners or operators of all serial numbers PA-34-200, PA-34-200T and PA-34-220T airplane models about an airworthiness concern and the potential failure to extend

of the nose landing as a result of the bolt head that could jam on the aft tube assembly-nose gear door actuation. This failure is due to the hex-head bolt on the nose gear centering spring rod-end to the nose gear strut when it contacts the nose gear door actuation aft tube assembly. This action, thus, prevents the extension of the nose gear assembly.

After the review of the aircraft's airframe logbook, it was found that the SAIB was not considered during the last MPI.

9. After the accident, the landing gear hydraulic system was cycled, and the emergency extension system was also tested and were both found serviceable.

10. The gear was extended above the recommended maximum operating speed of 85kts.

Probable Cause(s)

The nose landing gear failed to extend during the landing phase and the aircraft landed with the retracted nose gear.

Contributing Factor(s)

It is possible that the nose gear doors failed to open because of the bolt head jam on the aft tube assembly-nose gear door actuation. This failure is due to a hex-head bolt on the nose gear centering spring rod-end to the nose gear strut that could have contacted the nose gear door actuation aft tube assembly.

Safety Action(s)

None.

Safety Message and/or Safety Recommendation/s

None.

About this Report

The decision to conduct a limited investigation is based on factors including whether the cause is known and the evidence supporting the cause is clear, the level of safety benefit likely to be obtained from an investigation and that will determine the scope of an investigation. For this occurrence, a limited 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 limited report. The report has been compiled using information supplied in the initial notification, as well as from follow-up desk top enquiries 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 occurrence.

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

In terms of Regulation 12.03.1 of the Civil Aviation Regulations (CAR) 2011 and ICAO Annex 13, 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 issued by:
Accident and Incident Investigations Division
South African Civil Aviation Authority
Republic of South Africa