Accident and Incident Investigations Division

Accident
- Preliminary Report -
AIID Ref No: CA18/2/3/10033

Figure 1: PA-34 200T Seneca II, ZS-KFG. (Source: ATO)

Description:

On 26 August 2021, a student pilot accompanied by an instructor on-board a Piper 34 Seneca II with registration ZS-KFG took off from Springs Aerodrome (FASI) to conduct a conversion to multi-engine rating at the general flying area Hotel Golf Victor (HGV) (Johannesburg Special Rules South very high frequency omni-directional range [VOR] beacon) before returning to FASI. The student pilot stated that everything was normal during final approach and that they had three greens on the instrument panel (indicating that the landing gears were down); he also cross-checked on the side mirror that the landing gear was down and locked. The aircraft touched down a few metres after the threshold, however, approximately 3 seconds later, the nose gear collapsed. The flight was conducted under the provisions of Part 141 of the Civil Aviation Regulations (CAR) 2011 as amended.

INTRODUCTION

Reference Number	**:** CA18/2/3/10033
Name of Operator	**:** Mach 1 Aviation
Manufacturer	**:** Piper Aircraft Corporation
Model	**:** PA-34 200T Seneca II
Nationality	**:** South African
Registration Marks	**:** ZS-KFG
Place	**:** Springs Aerodrome (FASI)
Date	**:** 26 August 2021
Time	**:** 0900Z

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****.*

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.

Investigation Process:

The accident was notified to the Accident and Incident Investigations Division (AIID) on 26 August 2021 at about 1119Z. The investigator/s dispatched to Springs Aerodrome (FASI) on 9 September 2021 to do a follow up investigation. The accident was reported to the State of manufacture (NTSB) and the State had not appointed an accredited representative at the time of issuing this preliminary report. The AIID is leading the investigation as the Republic of South Africa is the State of Occurrence.

The information contained in this preliminary report is derived from the factual information gathered during the on-going investigation into the occurrence. Later, an interim report or the final report may contain altered information in case new evidence is found during the on-going investigation that require changes to the information depicted in this report.

The AIID reports are made available to the public at:
http://www.caa.co.za/Pages/Accidents%20and%20Incidents/Aircraft-accident-reports.aspx
Notes:

1. Whenever the following words are mentioned in this report, they shall mean the following:

- *Accident — this investigated accident*
- *Aircraft — the Pipe 34 Seneca II involved in this accident*
- *Investigation — the investigation into the circumstances of this accident*
- *Pilot — the pilot involved in this accident*
- *Report — this accident report*

2. Photos and figures used in this report were taken from different sources and may have been adjusted from the original for the sole purpose of improving clarity of the report. Modifications to images used in this report were limited to cropping, magnification, file compression; or enhancement of colour, brightness, contrast; or addition of text boxes, arrows or lines.

Disclaimer:

This report is produced without prejudice to the rights of the AIID, which are reserved.

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ABBREVIATION	DESCRIPTION
AIID	Accident and Incident Investigations Division
AMO	Aircraft Maintenance Organisation
ATO	Aviation Training Organisation
CAR	Civil Aviation Regulation
CofA	Certificate of Airworthiness
CofR	Certificate of Registration
CVR	Cockpit Voice Recorder
FAOR	O.R. Tambo International Airport
FASI	Springs Aerodrome
FDR	Flight Data Recorder
GPS	Global Positioning System
hPa	Hectopascal
KIAS	Knots Indicated Airspeed
KM	Kilometres
METAR	Meteorological Terminal Air Routine Report
MHz	Megahertz
MPI	Mandatory Periodic Inspection
NTSB	National Transportation Safety Board
PIC	Pilot-in-command
PPL	Private Pilot Licence
QNH	Query Nautical Height
RPM	Revolutions Per Minute
SACAA	South African Civil Aviation Authority
SAWS	South African Weather Service
TBO	Time Between Overhaul
VOR	Very High Frequency Omni-Directional Range

1. FACTUAL INFORMATION

1.1. History of Flight

1.1.1 On 26 August 2021, a student pilot accompanied by an instructor on-board a Piper 34 Seneca II with registration ZS-KFG took off from Springs Aerodrome (FASI) to conduct a conversion to multi-engine rating at the general flying area Hotel Golf Victor (HGV) (Johannesburg Special Rules South very high frequency omni-directional range [VOR] beacon) before returning to FASI. The flight was conducted under the provisions of Civil Aviation Regulation (CAR) Part 141 as amended. Clear weather conditions prevailed at the time leading to the accident.

1.1.2 The instructor stated that after take-off from Runway (RWY) 21, they routed to HGV to conduct a simulated landing in the general flying area. The instructor broadcasted their intentions on frequency 125.6 Megahertz (MHz). Upon completion in the general flying area, they routed north, bound to return to FASI. The instructor stated that when inbound FASI, an unmanned joining procedure on right downwind was flown as there was another aircraft in the circuit. Downwind checks were completed, which included undercarriage cycle. Also, there were three greens (indicating that the landing gears were down); and no warning lights on the instrument panel. The approach was stable with the airspeed in the blueline arc (90 knots) and flap setting of 25˚. The instructor further stated that the approach was stable with a slight 10kt crosswind from the right.

1.1.3 According to the student pilot (who was the pilot flying), during final approach everything was normal, they had three greens and cross-checked on the side mirror that the gear was down and locked. The aircraft touched down a few metres (m) after the threshold, however, approximately 3 seconds later, the nose gear collapsed. Both propellers came in contact with the ground and the aircraft skidded on its nose cone for approximately 557m from the threshold. Neither the student pilot nor the instructor applied the toe brakes to try stop the aircraft from skidding.

1.1.4 The aircraft was substantially damaged during the accident sequence and no injuries were reported.

1.1.5 During recovery of the aircraft, the main undercarriage was about to collapse, and therefore, the aircraft was placed on jacks. During inspection, it was noted that the main undercarriage down locks were not engaged, evidenced by the oleo strut which was swinging sideways. The emergency down selection was selected and down locks logged. The undercarriage drag braces were mobilised by attaching steel rods and the aircraft was moved by manpower to the hangar.

1.1.6 The accident occurred on RWY 21 at FASI at Global Position System (GPS) co-ordinates determined to be 26˚14’51.86” South 028˚23’51.57” East, at elevation 5 340 feet (ft).

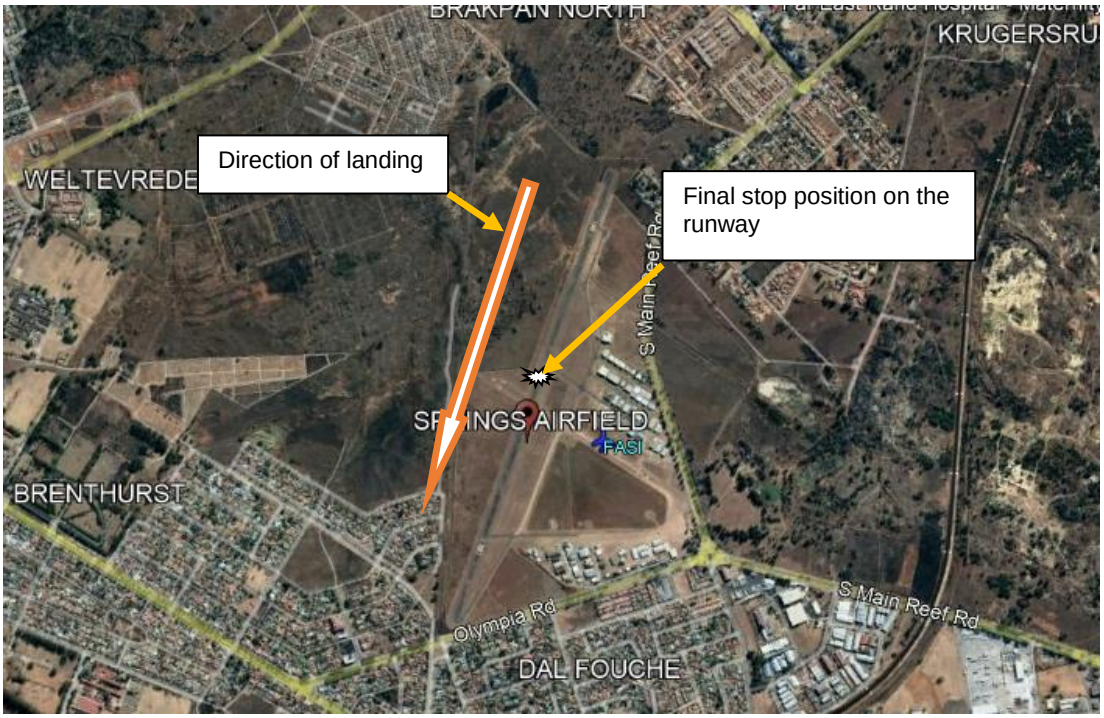

Figure 2: Overlay of the aerodrome. (Source: Google Earth)

1.2. Injuries to Persons

Injuries	Pilot	Crew	Pass.	Total On-board	Other
Fatal	-	-	-	-	-
Serious	-	-	-	-	-
Minor	-	-	-	-	-
None	2	-	-	2	-
Total	**2**	-	-	**2**	-

Note: Other means people on ground.

1.3. Damage to Aircraft

1.3.1 The aircraft sustained substantial damage during the accident sequence.

Figure 3: The damaged nose section.

1.4. Other Damage

1.4.1 None.

1.5. Personnel Information

1.5.1 Instructor Pilot

Nationality	Libyan	Gender	Male	Age	26
Licence Number	**********	Licence Type	Commercial Pilot Licence (A)		
Licence Valid	Yes	Type Endorsed	Yes		
Ratings	Instrument and flight instructor grade 2				
Medical Expiry Date	31 December 2021				
Restrictions	None				
Previous Accidents	None				

Note: Previous accidents refer to past accidents the pilot was involved in, when relevant to this accident.

Flying Experience:

Total Hours	1255.4
Total Past 24 Hours	3.3
Total Past 7 Days	9.5
Total Past 90 Days	87.5
Total on Type Past 90 Days	59.7
Total on Type	78.8

1.5.2 Student Pilot

Nationality	Indian	Gender	Male	Age	24
Licence Number	**********	Licence Type	Private Pilot Licence (A)		
Licence Valid	Yes	Type Endorsed	Yes		
Ratings	Night rating				
Medical Expiry Date	13 July 2026				
Restrictions	None				
Previous Accidents	None				

Note: Previous accidents refer to past accidents the pilot was involved in, when relevant to this accident.

Flying Experience:

Total Hours	203
Total Past 24 Hours	1.8
Total Past 7 Days	13.3
Total Past 90 Days	21
Total on Type Past 90 Days	3.5
Total on Type	3.5

1.5.3 The instructor pilot was issued a Commercial Pilot Licence (CPL) on 29 March 2021 with an expiry date of 30 March 2022. The conversion on type was done on 22 November 2016 and a total of 14.2 hours were flown, according to the logbook entry. The initial instructor training was done on 23 November 2017 and was renewed on 29 March 2021, with an expiry date of 31 March 2024. The instructor pilot had a Grade 2 instructor licence; he was also issued a Class 1 medical certificate on 3 December 2020 with an expiry date of 31 December 2021, with no medical waiver.

1.5.4 The student pilot was issued a Private Pilot Licence (PPL) on 7 September 2020 with an expiry date of 30 August 2021. The student pilot was in the process of acquiring a type conversion and had accumulated 3.5 hours. The student pilot was issued a Class 2 medical certificate on 13 July 2021 with an expiry date of 13 July 2026, with no medical waiver.

1.5.5 The student was in possession of a dispensation letter (extension on the licence) issued by the Regulator (SACAA) on 14 July 2021 for a period of 30 days (from 1 September 2021 to 30 September 2021).

1.6. Aircraft Information

Airframe:

Manufacturer/Model	Piper Aircraft Corporation	
Serial Number	34-7870276	
Year of Manufacture	1978	
Total Airframe Hours (At Time of Accident)	5167.2	
Last MPI (Date & Hours)	20 August 2021	5157.7
Hours Since Last MPI	9.5	
C of A (Issue Date)	15 July 2021	
C of A Expiry Date	31 July 2022	
C of R (Issue Date) (Present Owner)	20 July 2019	
Type of Fuel Used in the Aircraft	Avgas	
Operating Categories	Part 141	
Previous Accidents	None	

Note: Previous accidents refer to past accidents the aircraft was involved in, when relevant to this accident.

Engine: 1

Manufacturer/Model	Continental
Serial Number	811268-R
Part Number	LTSIO-360-KB CEB
Hours Since New	1 105.2
Hours Since Overhaul	TBO not reached

Engine: 2

Manufacturer/Model	Continental
Serial Number	812003-R
Part Number	LTSIO-360 KB CEB
Hours Since New	1 105.2
Hours Since Overhaul	TBO not reached

Propeller: 1

Manufacturer/Model	Hartzell
Serial Number	AN4523
Part Number	BHC-C2YF-2KLUF
Hours Since New	5 157.7
Hours Since Overhaul	544.8

Propeller: 2

Manufacturer/Model	Hartzell
Serial Number	ANH4103
Part Number	BHC-C2YF-2KLUF
Hours Since New	5 157.7
Hours Since Overhaul	531.3

1.6.1 According to the aircraft logbook, the last Mandatory Periodic Inspection (MPI) was carried out on 20 August 2021 at (1 095.8 Hobbs meter reading) 5 157.7 airframe hours. A Certificate of Release to Service (CRS) was issued by the aircraft maintenance organisation (AMO) on 20 August 2021 with an expiry date of 20 August 2022 or at (1 195.8 Hobbs meter reading) 5257.7 airframe hours, whichever comes first.

1.6.2 The aircraft was initially issued a Certificate of Airworthiness (C of A) on 11 July 1999; the latest reissued C of A had an expiry date of 31 July 2022.

1.6.3 The aircraft was issued a Certificate of Registration (C of R) under the current owner on 30 July 2019.

1.7. Meteorological Information

1.7.1 The weather information below was obtained from the South African Weather Service (SAWS) via an automatic weather station at O.R. Tambo International Airport (FAOR), issued to the accident flight on 26 August 2021 at 0900Z. FAOR is the nearest station from FASI.

METAR: FAOR 260900Z 32011KT 290V300 CAVOK 19/06 Q1026 NOSIG

Wind Direction	320˚	Wind Speed	11kt	Visibility	9999km
Temperature	19˚C	Cloud Cover	Nil	Cloud Base	Nil
Dew Point	06˚C	QNH	1026 hPa		

1.8. Aids to Navigation

1.8.1 The aircraft was equipped with standard navigational equipment as approved by the Regulator. There were no reported or recorded defects with the navigational equipment prior to the flight.

1.9. Communication

1.9.1 The aircraft was equipped with standard communication equipment as approved by the Regulator. There were no reported or recorded defects with the communication systems before and during the flight.

1.10. Aerodrome Information

Aerodrome Location	Springs Aerodrome (FASI)
Aerodrome Status (Licensed/Registered/Unlicensed)	Unlicensed
Aerodrome Co-ordinates	26˚14'51.86" South 028˚23'51.57" East
Aerodrome Altitude	5 340 ft
Runway Headings	03/21
Runway Dimensions	1 600m x 18m
Runway Used	21
Runway Surface	Asphalt
Approach Facilities	End of runway light
Radio Frequency	122.4 MHz

1.11. Flight Recorders

1.11.1 The aircraft was not equipped with a flight data recorder (FDR) or a cockpit voice recorder (CVR).

1.12 Wreckage and Impact Information

1.12.1 The aircraft approached the runway from the north-east and touched down just after the threshold. During landing, the nosewheel collapsed and the propeller tips from all four blades impacted the ground and, as a result, curled inward.

1.12.2 As evidenced by the propeller marks on the asphalt surface, the first impact marks of both propeller tips were approximately 255m from the runway threshold. Both propeller tip marks continued for approximately 20m. It was evident that towards the end of the propeller marks on the asphalt, the nose cone made contact with the runway surface and the aircraft skidded on its nose cone and propeller tips for a further 282m before coming to a halt just after the second taxiway intersection. The distance from the threshold to the end of the nose cone scraping marks was 557m.

Figures 4 and 5: Arrows showing left- and right-side propeller tip marks on the asphalt runway.

Figure 6: Left- and right-side propeller assemblies.

FIngure 7: A propeller tip with scrape marks.

Figure 8: The arcraft after coming to a halt. (Source: ATO)

1.12.3 The aircraft was recovered to the Aviation Training Organisation's (ATO's) hangar by the aircraft maintenance organisation's (AMO's) engineers. During recovery, it was discovered that the main undercarriage was unstable as it started to collapse when the

aircraft was moved, indicative of both locks not being in the “locked” position. The aircraft was then placed on jacks, the emergency extension was selected, and the down locks were engaged. The undercarriage was mobilised by attaching a steel rod on the extension/retraction links.

1.13 Medical and Pathological Information

1.13.1 None.

1.14 Fire

1.14.1 There was no evidence of a pre- or post-impact fire.

1.15 Survival Aspects

1.15.1 The accident was considered survivable because the fuselage and cockpit structures were still intact, and both occupants had made use of the aircraft’s safety harnesses.

1.16 Tests and Research

1.16.1 Post-accident, it was discovered that the nosewheel link assembly (down lock) had broken off and separated from the rod end bearing. The cause of the damage to the link assembly is yet to be determined in the final report.

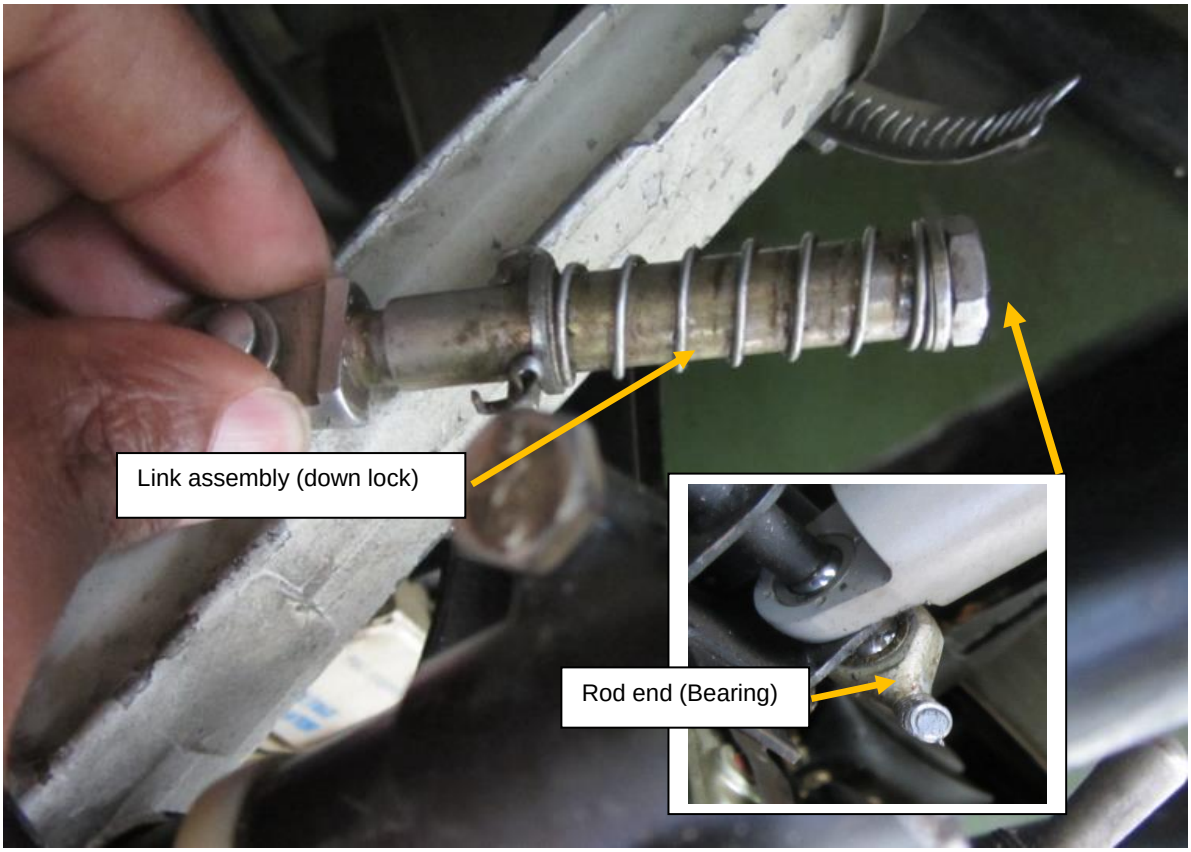

Figure 9: Failed link assembly down lock.

1.17 Organisational and Management Information

1.17.1 This was a training flight conducted under the provisions of Part 141 of the Civil Aviation Regulation 2011 as amended.

1.17.2 The ATO was issued an ATO certificate on 17 June 2020 with an expiry date of 30 June 2025.

1.17.3 The AMO that carried out the last MPI was in possession of an AMO certificate issued on 5 August 2021 with an expiry date of 31 July 2022.

1.18 Additional Information

1.18.1 **Approach and landing** (Source Piper Seneca POH)

Gear warning horn	*Check*
Airspeed	*98 KIAS on downwind leg*
Seat backs	*erect*
Seat belts and harness	*fastened/adjust*
Fuel selectors	*ON*
Cowl flaps	*as required*
Auxiliary fuel pumps	*OFF*
Mixture controls	*set*
Propellers	*2250 RPM*
Landing gear	*Down, 127 KIAS max*
Flaps	*set as required*
Airspeed	*97 KIAS on base leg,*
	87 KIAS on final
On close final	
Power	*reduced*
Prop. Controls	*full FORWARD*

After landing

Clear of runway	
Flaps	*retract*
Cowl flaps	*fully OPEN*
Alternate air	*OFF*

1.18.2 Nose gear assembly illustration (Source: Illustrated Part Catalogue)

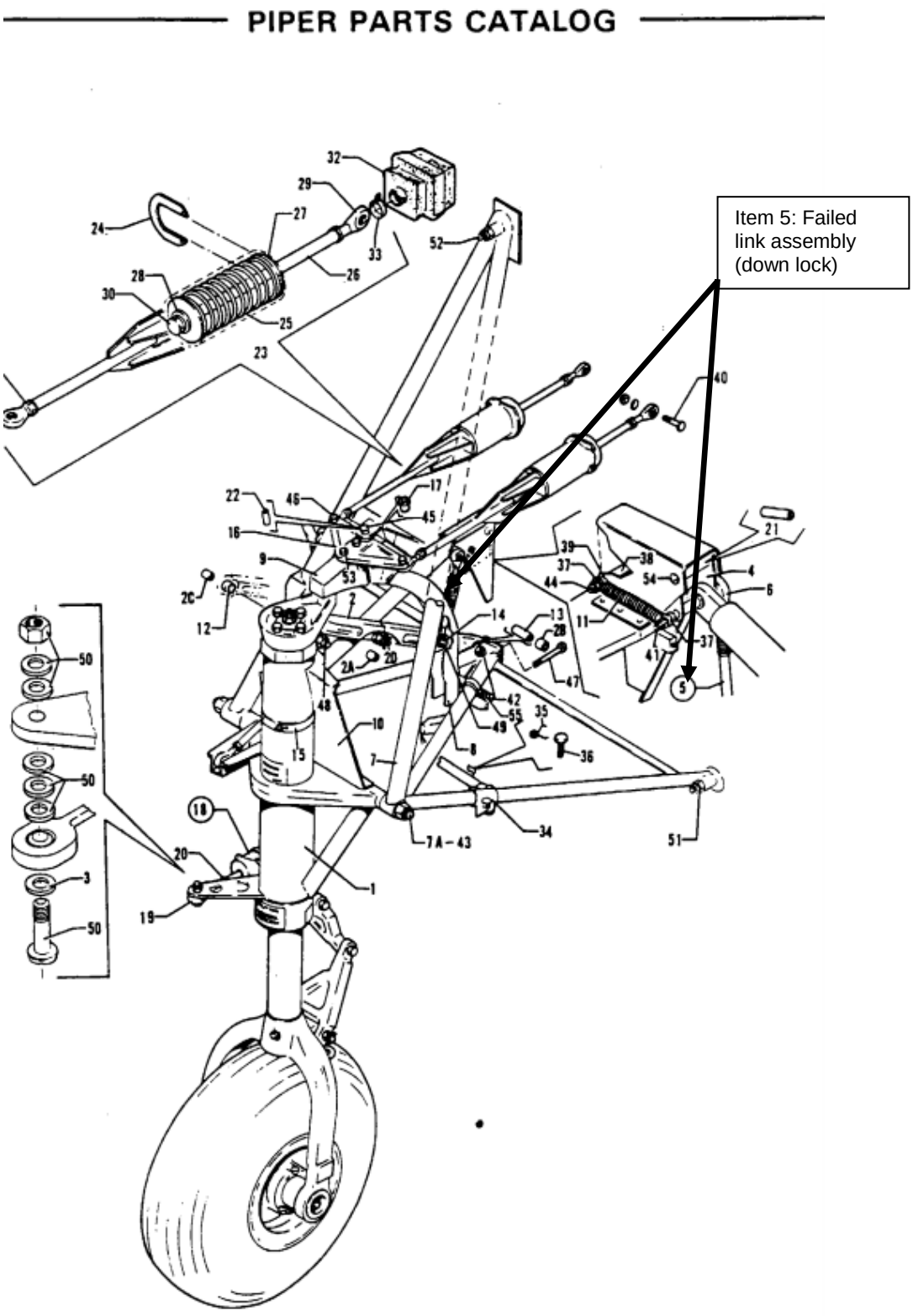

Diagram 1: Nose gear assembly schematics. (Source: Illustrated Part Catalogue)

1.19 Useful or Effective Investigation Techniques

1.19.1 None.

2. Findings

2.1 General

From the available evidence, the following preliminary findings were made with respect to this accident. These shall not be read as apportioning blame or liability to any particular organisation or individual.

To serve the objective of this investigation, the following sections are included in the conclusions heading:

- **Findings —** are statements of all significant conditions, events or circumstances in this accident. The findings are significant steps in this accident sequence, but they are not always causal or indicate deficiencies.

2.2 Findings

2.2.1 The instructor was issued a Commercial Pilot Licence (CPL) on 29 March 2021 with an expiry date of 30 March 2022. The instructor was issued a valid Class 1 medical certificate on 3 December 2020 with an expiry date of 31 December 2021, with no medical waivers. The instructor had a Grade 2 instructor rating, issued on 29 March 2021 with an expiry date of 31 March 2024.

2.2.2 The student pilot was issued a Private Pilot Licence (PPL) on 7 September 2020 with an expiry date of 31 August 2021. The student pilot was issued a Class 2 medical certificate on 13 July 2021 with an expiry date of 13 July 2026, with no medical waiver. The student pilot was in possession of a dispensation letter for the licence and ratings, issued by the Regulator on 14 July 2021 for the period 1 September 2021 to 30 September 2021.

2.2.3 The ATO was issued a valid ATO certificate on 17 June 2020 with an expiry date of 30 June 2025.

2.2.4 The AMO that certified and released the aircraft after the MPI was in possession of the AMO certificate issued on 5 August 2021 with an expiry date of 31 July 2022.

2.2.5 The aircraft was issued a Release to Service certificate by the AMO on 20 August 2021 at 5 157.7 (1 095.8 Hobbs meter reading) airframe hours with an expiry date of 20 August 2022 or at 5 257.7 (1 195.8 Hobbs meter reading) airframe hours, whichever comes first.

2.2.6 The aircraft was initially issued the Certificate of Airworthiness on 11 July 1999; the reissued C of A had an expiry date of 31 July 2022.

2.2.7 The aircraft was issued a Certificate of Registration under the current owner on 30 July 2019.

2.2.8 The weather, at the time of the accident, was not a factor.

2.2.9 This was the student pilot's training flight towards conversion to multi-engine rating conducted under the provisions of Part 141 of the Civil Aviation Authority 2011 as amended.

2.2.10 The aircraft sustained substantial damage during the accident; however, no persons were injured.

2.2.11 Preliminary findings revealed that the nose gear link assembly down lock mechanism had failed, resulting in the collapse of the nose gear during landing.

2.2.12 The student pilot stated that during final approach, everything was normal and that the instrument panel had three greens (indicating that the landing gear was down and locked). The student pilot also cross-checked on the side mirror that the landing gears were down. The aircraft touched down a few metres from the threshold, and approximately 3 seconds later, the nose gear collapsed.

3. On-going Investigation

3.1 The AIID investigation is on-going and the investigator/s will be looking into other aspects of this occurrence which may or may not have safety implications.

This report is issued by:

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