SOUTH AFRICAN CIVIL AVIATION AUTHORITY

AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

				Reference:	**CA18/2/3/9780**
Aircraft Registration	**ZS-ICB**	**Date of Accident**	29 March 2019	**Time of Accident**	1430Z
Type of Aircraft	Piper PA 30		**Type of Operation**	Training (Part 141)	
Pilot-in-command Licence Type	Airline Transport Pilot Licence	**Age**	30	**Licence Valid**	Yes
Pilot-in-command Flying Experience	Total Flying Hours	3846.3		Hours on Type	148.4
Last Point of Departure	Rand Aerodrome (FAGM), Gauteng				
Next Point of Intended Landing	Syferfontein Aerodrome (FASY), Gauteng				
Location of the accident site with reference to easily defined geographical points (GPS readings if possible)					
Westonaria 16nm south-west of Johannesburg CBD at the following GPS co-ordinates: S20º 11' 54" E027º 46' 43.5" with and elevation of 5393ft					
Meteorological Information	Wind: 170º at 06 kts, Visibility: CAVOK, Temperature: 28ºC, Dew point: 07ºC, Query Nautical height (QNH): 1022hpa				
Number of People On-board	2+0	**No. of People Injured**	2	**No. of People Killed**	0
Synopsis					

On 29 March 2019, an instructor and a student pilot took off from the Rand Aerodrome (FAGM) to Syferfontein Aerodrome (FASY) with the intention to practise asymmetric circuits, and then return to FAGM. On arrival at FASY, the instructor demonstrated the first asymmetric circuit on Runway 31 (RWY 31). Thereafter, the student pilot took over control of the aircraft and followed a right-hand circuit pattern. On downwind, the instructor put the left engine on idle to simulate an engine failure; and the student pilot configured the aircraft for single engine operation while completing the circuit. On final approach whilst the aircraft was 300 feet (ft) above ground level (AGL), the instructor gave power to the left engine and the student pilot touched down uneventfully.

After a successful touch down, the student pilot then applied full power to both engines for take-off, the aircraft accelerated to 80 knots (kts) before rotation. During rotation, the aircraft banked sharply to the right and the instructor took over control and feathered the right-side engine, but it did not respond as expected. The aircraft lost height and impacted the ground with the right-side wing before ground-looping and skidding, facing the opposite direction from which it had initially taken off. The aircraft came to a stop 120m from the edge of RWY 14. The crew sustained minor injuries and the aircraft was destroyed.

The investigation revealed that an incorrect throttle control cable end fitting was fitted to the aircraft's right-side engine which separated on the third circuit as the student pilot applied full power. This caused the aircraft, while flying very low, to pull sharply to the right and to roll in the same direction before impacting the ground with the right wing. This resulted in the engine's failure to develop power required for climb.

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ABBREVIATION	DESCRIPTION
AMO	Aircraft Maintenance Organisation
°C	Degrees Celsius
AGL	Above Ground Level
AMSL	Above Mean Sea Level
BKN	Broken (3-5 octas)
C of A	Certificate of Airworthiness
CAVOK	Ceiling and Visibility Okay
CVR	Cockpit Voice Recorder
FACT	Cape Town International Aerodrome
FDR	Flight Data Recorder
FEW	Few (2-3 Octas)
ft.	Feet
GPS	Global Positioning System
hPa	Hectopascals
IFR	Instrument Flight Rules
kts	Knots
l	Litre(s)
JSF	Johannesburg School of Flying
m	Metre(s)
MHz	Megahertz
mm	Millimetres
Nm	Nautical Mile
OVC	Overcast (8 Octas)
POH	Pilot's Operating Handbook
SAWS	South African Weather Service
SB	Safety Bulletin
SCT	Scattered (5-7 octas)
VFR	Visual Flight Rules
VHF	Very High Frequency

Reference Number	**:** CA18/2/3/9780
Name of Owner	**:** Panayiotou C
Name of Operator	**:** Johannesburg School of Flying
Manufacturer	**:** Piper Aircraft Corporation
Model	**:** PA-30
Nationality	**:** South African
Registration Marks	**:** ZS-ICB
Place	**:** Westonaria
Date	**:** 29 March 2019
Time	**:** 1430Z

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 (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****.*

Investigations process:

The accident was notified to the Accident and Incident Investigations Division (AIID) on 29 March 2019 at about 1630Z. The investigator/s went to Baragwanath Aerodrome on 30 March 2019. The investigator/s co-ordinated with all authorities on site by initiating the accident investigation process according to CAR Part 12 and investigation procedures. The AIID of the South African Civil Aviation Authority (SACAA) is leading the investigation as the Republic of South Africa is the State of Occurrence.

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

- *Accident – this investigated accident*
- *Aircraft – the Piper PA30 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 be adjusted from the original for the sole purpose of improving clarity of the report. Modifications to images used in this report are 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.

1.1. History of Flight

1.1.1 On 29 March 2019 at approximately 1400Z, an instructor accompanied by a student pilot departed the Rand Aerodrome (FAGM) to Syferfontein Aerodrome (FASY) for asymmetric circuit exercises. From FAGM, they routed directly to FASY, which is 21 nautical miles (nm) to the west of FAGM. Upon arrival at FASY, they joined the right-hand side circuit of Runway 31.

1.1.2 The instructor indicated that this was the student pilot's first asymmetric circuit, however, she had previously done a few hours of asymmetric engine training at the general flying area at FAGM. The instructor demonstrated the first circuit of asymmetric configuration with the aircraft's right-side engine simulating failure. The demonstration went well. On the second circuit, the student pilot took over control of the aircraft. Whilst on downwind, the instructor simulated a left-side engine failure and the student pilot followed the asymmetric configuration procedures: *directional control (lift the dropping wing to the live engine)*, *speed in the blue line, power up the live engine, and clean up the aircraft (pull up the landing gear)*.

1.1.3 On final approach whilst the aircraft was 300 feet (ft) above ground level (AGL), the instructor and the student pilot had to decide if they were going to land the aircraft or if they were going to do a go-around (*instructors test student pilots to see if they would comfortably land the aircraft with one engine inoperative. This exercise is vital to determine the maturity of the student pilots in making important/critical decisions*). The student pilot decided that she would land the aircraft. Therefore, the instructor powered the simulated failed engine (left-side engine). The aircraft touched down at the correct point at approximately 60 knots (kts) and continued to roll. To continue with the asymmetric exercise, the student pilot increased power to both engines for take-off again. Upon rotation at around 80kts, the instructor reported that he felt the aircraft pulling sharply to the right, and the right engine's revolutions per minute (RPM) fluctuated. He advised the student pilot to hand over control; he then levelled the aircraft. When he tried to feather the right engine, the engine seemed to lose all power. Thereafter, the aircraft started losing height from 20ft AGL and the right wing dropped and impacted the ground. The aircraft swung around and skidded backwards before coming to a stop facing south.

1.1.4 The accident occurred during daylight at Global Positioning System (GPS) co-ordinates S20º 11' 54" E027º 46' 43.5" at an elevation of 5393ft.

Figure 1: Location of the wreckage at FASY.

1.2. Injuries to Persons

Injuries	Pilot	Crew	Pass.	Other
Fatal	-	-	-	-
Serious	-	-	-	-
Minor	1	1	-	-
None	-	-	-	-

1.3. Damage to Aircraft

1.3.1 The aircraft was destroyed during the accident.

Figure 2: The aircraft's wreckage at the accident site.

1.4. Other Damage

1.4.1 None.

1.5. Personnel Information: Instructor

Nationality	South African	Gender	Male	Age	30
Licence Number	027 228 4746	Licence Type	ATPL		
Licence Valid	Yes	Type Endorsed	Yes		
Ratings	Instrument, night and instructor GRII				
Medical Expiry Date	30 June 2019				
Restrictions	None				
Previous Accidents	None				

Flying Experience:

Total Hours	3846.3
Total Past 90 Days	80.4
Total on Type Past 90 Days	14.7
Total on Type	148.4

1.5.1 The instructor was issued an Airline Transport Pilot Licence (ATPL) on 13 June 2018 with an expiry date of 30 June 2019. He was also issued a Grade II instructor rating endorsement. He had a Class 1 medical certificate issued on 12 May 2018 with an expiry date of 31 May 2019.

1.5.2 The instructor had 2672.7 hours total instruction experience over a period of seven years. Of that, 195.2 hours were on multi-engine training in the aircraft and, about 200 hours, were on multi-engine simulator training.

Personnel Information: Student Pilot

Nationality	South African	Gender	Female	Age	23
Licence Number	027 251 1973	Licence Type	PPL		
Licence Valid	Yes	Type Endorsed	Yes		
Ratings	None				
Medical Expiry Date	30 September 2019				
Restrictions	None				
Previous Accidents	None				

1.5.3 The student pilot had completed her conversion and asymmetric exercises in the general flying area on the aircraft at FAGM. The accident flight was the first asymmetric exercise in the circuit environment. She was preparing for her upcoming Commercial Pilot Licence test when the accident occurred.

Flying Experience:

Total Hours	268.4
Total Past 90 Days	10.4
Total on Type Past 90 Days	10.4
Total on Type	10.4

1.6. Aircraft Information

Airframe:

Type	PA-30	
Serial Number	30-1911	
Manufacturer	Piper Aircraft Corporation	
Date of Manufacture	1969	
Total Airframe Hours (At time of Accident)	6319.2	
Last MPI (Date & Hours)	23 November 2018	6279.9
Hours Since Last MPI	39.3	
C of A (Expiry Date)	31 December 2019	
C of R (Issue Date) (Present owner)	12 February 2015	
Operating Categories	Part 141	

Engine: 1 (Left side)

Type	Lycoming
Serial Number	L-4258-55A
Hours Since New	6319.2
Hours Since Overhaul	39.3

Propeller: 1 (Left side)

Type	Hartzell HC-E2YL-2
Serial Number	BG 5325 B
Hours Since New	39.3
Hours Since Overhaul	TBO not reached.

Engine: 2 (Right side)

Type	Lycoming
Serial Number	L-4254-55A
Hours Since New	6319.2
Hours Since Overhaul	39.3

Propeller: 2 (Right side)

Type	Hartzell HC-E2YL-2
Serial Number	BG 5328 B
Hours Since New	39.3
Hours Since Overhaul	TBO not reached

1.6.1 The two new propellers were fitted on 23 November 2018 by AMO 071 after the wheels up landing that occurred in January 2017 at 6279.9 airframe hours. The aircraft was grounded during that period.

1.7. Meteorological Information

1.7.1 The weather information was obtained from the South African Weather Service (SAWS). The Meteorological Aeronautical Report (METAR) was for 29 March 2019 for O.R. Tambo International Aerodrome (FAOR) located 27nm from FASY.

Wind direction	170º	Wind speed	06kts	Visibility	CAVOK
Temperature	28ºC	Cloud cover	Nil	Cloud base	Nil
Dew point	07ºC	QNH	1022hPa		

1.8. Aids to Navigation

1.8.1 The aircraft was equipped with standard navigational equipment as approved by the Regulator (SACAA) for this aircraft type. There were no recorded defects recorded prior to the accident.

1.9 Communication

1.9.1 The aircraft was equipped with standard communication equipment as approved by the Regulator for this aircraft type. There were no recorded defects reported prior to the accident.

1.10 Aerodrome Information

Aerodrome Location	FASY
Aerodrome Co-ordinates	S20º 11' 54" E027º 46' 43.5"
Aerodrome Elevation	5393 feet
Runway Designations	13/31
Runway Dimensions	1000X10
Runway Used	31
Runway Surface	Asphalt
Approach Facilities	None

1.11 Flight Recorders

1.11.1 The aircraft was not fitted with a cockpit voice recorder (CVR) or a flight data recorder (FDR), and neither was required by regulation to be fitted to this aircraft type.

1.12 Wreckage and Impact Information

1.12.1 During the second asymmetric circuit exercise, the student pilot applied power to increase speed and, when the aircraft reached 80kts, the student pilot rotated the aircraft. At this time, the instructor felt a sharp pull to the right. The instructor noticed that the right-side engine RPM on the instrument panel were fluctuating. He then took control of the aircraft and tried to continue with the flight by pulling back the right-side throttle and feathering the engine. The aircraft yawed to the right and the right-side wing dropped and impacted the ground.

Figure 3: The damaged right-side engine propeller.

Figure 4: The left-side engine propeller with tips bending backwards. Both propellers were rotating at different revolutions per minute (RPM).

1.12.2 After impacting the ground, the aircraft ground-looped and skidded backwards. The aircraft came to a stop 120 metres (m) beyond the threshold of RWY 14. A 2m outboard wing tip of the right wing and its aileron broke off from the wing spar and the two engines separated from the airframe. The two main landing gears were damaged in the accident sequence. The right-side propeller (Figure 3) showed signs of low speed rotation, indicated by the bent propeller facing backwards. The left-side propeller (Figure 4) showed signs of having had power when making contact with the ground (prop strike resemblance).

Figure 5: The skid marks on the ground and the broken off right-side outboard wing.

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

The accident was considered survivable as there was no damage to the cockpit and cabin areas which would have caused serious injuries to both occupants.

1.16 Tests and Research

1.16.1 The two engines were taken to the operator's aircraft maintenance organisation (AMO) for teardown inspection to determine the cause of RPM fluctuation. Visual inspection revealed no anomalies on engine number 1 (left-side engine). On engine number 2 (right-side engine), the following were found in a satisfactory condition:

- The spark plugs
- The magnetos
- Oil filter

1.16.2 Further inspection on the number 2 engine revealed that the throttle control cable end fitting was missing. The teardown inspection was stopped soon after it was discovered that a throttle control cable end fitting (Figure 7) was missing. It was later found in the wreckage and it was not the original equipment fitted by the manufacturer. On inspection of the logbooks, it was discovered that the throttle control cable end fitting was fitted on 24 July 2018.

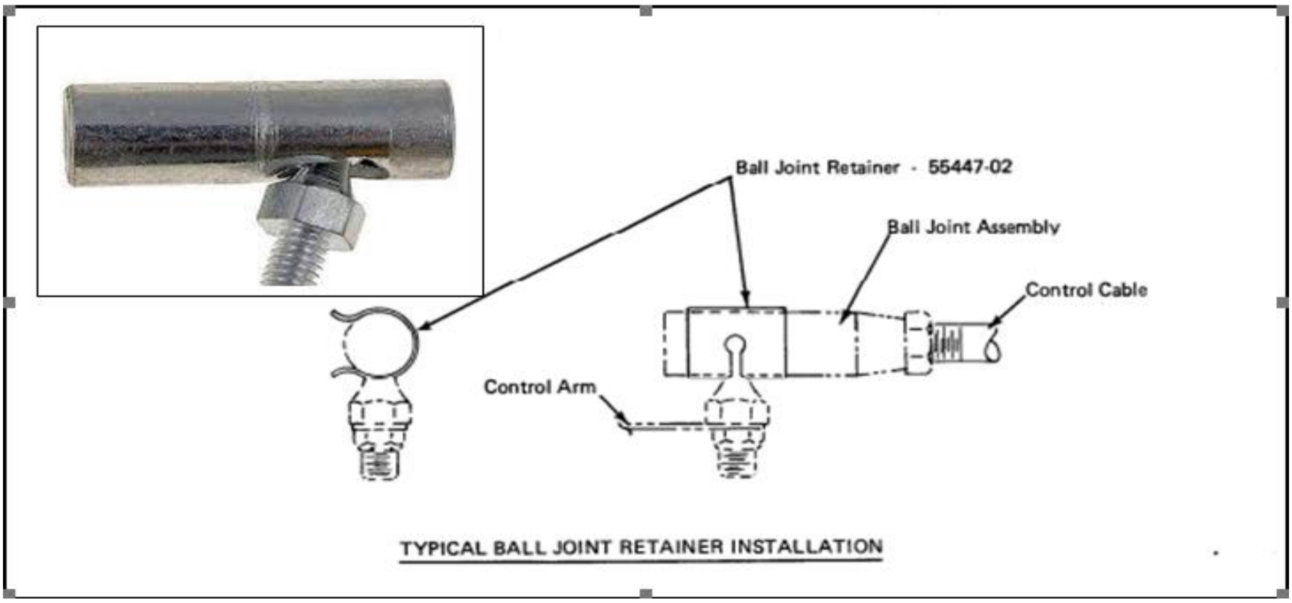

Figure 6: The inset shows a missing retainer which the Service Bulletin is mandating to be installed where a ball joint is located.

1.16.3 Piper issued a Service Bulletin (SB) 515 which relates to the mandatory installation of the ball joint retainer. All the affected aircraft, including ZS-ICB, serial numbers are listed on the SB (see Appendix B).

Figure 7: The number 2 engine throttle lever which is missing a throttle control cable end fitting.

Figure 8: The ball joint retainer that was removed by the investigating team.

Figure 9: The difference between the manufacturer-approved cable end fitting (original) and the unapproved cable end fitting that had failed.

1.17 Organisational and Management Information

1.17.1 The aircraft was operated by the Aviation Training Organisation (ATO) No: SACAA/1033/ATO, Johannesburg School of Flying (JSF) for training in accordance with the requirements of Part 141 of the CAR 2011 as amended. The ATO approval certificate was issued on 24 November 2017 with an expiry date of 28 February 2022. According to training operations specifications on Appendix B, JSF was approved in June 2013 to offer Commercial Pilot Licence (CPL) courses and multi-engine ratings.

1.17.2 The AMO 009 was responsible for the aircraft maintenance. On 29 October 2018, the AMO sent an official letter to the Regulator indicating that from 31 October 2018, the organisation (AMO) will cease to exist (see Appendix A).

1.17.3 The AMO 071 performed the latest MPI dated 23 November 2018 wherein they fitted two new propellers and was the current AMO to JSF.

1.18 Additional Information

1.18.1 How an asymmetric circuit is conducted at Johannesburg Flying School. Source: Extract from JSF Training Procedures Manual (sent via email):

A typical asymmetric exercise starts at 7500'AMSL (around 2500'AGL) in the general flying area where the throttle lever of one of the engines is closed all the way. Depending on whether it is a demonstration or practice, either the instructor or student will complete the engine failure recovery procedure (maintain directional control and blue line speed, power up, clean up, identify, verify, fix, feather). At this stage, slight power is brought back on the "dead" engine to simulate it having been feathered, as we do not feather the engine in the simulation. Once comfortable, the "dead" engine is brought back to cruise power and the exercise can then be repeated with the other engine (and in different configurations) after time has been given for both engines to settle and warm up/cool down.

In the circuit, students are exposed to simulated engine failures on the downwind leg, base leg and after take-off (not below 500' AGL). The procedure remains essentially the same except for certain configuration considerations dependant on the position in the circuit.

Johannesburg School of Flying

P.O.Box 18066, Rand Airport, Germiston 1419, South Africa
Tel +27(0)11 827 9827 Fax +27 (0)11 824 3154

Est 1981

Multi Engine Crew Briefing

For this Take-off I will be using ……. Degrees of flap, on runway ……

- **In the event of an abnormality before rotation with sufficient runway remaining, I will close the power and apply sufficient braking to bring the aircraft to a stop before the end of the runway, thereafter I will advise ATC.**
- **In the event of an engine failure after rotation, I will maintain directional control, maintain blue line speed of…, confirm full power, clean up the aircraft (gear/flap up), identify and verify the failed engine and then feather the failed engine. I will then advise ATC and request the nearest available runway to land.**
- **In the event of a non-critical situation occurring after rotation I will advise ATC and request the nearest possible runway to land.**

Remember passenger brief before emergency brief.

Figure 10: Multi-engine crew briefing extract from JSF Training Procedures Manual.

PART 141 – TRANING PROCEDURES MANUAL OF JSF
PART 6: FLIGHT TRAINING SYLLABI

LESSON 2

RECOGNISE AND MANAGE (SIMULATED) ENGINE FAILURE IN FLIGHT

OBJECTIVE
To develop the student's ability to recognise engine failure in flight and manage the aircraft according to the AFM/POH.

BRIEFING (1 Hour)

1. Description of the planned exercises
2. Student actions expected
3. Review of applicable procedures
4. Review of applicable speeds, configurations and power settings
5. Contingency procedures

FLYING EXERCISE (1,5 hours aircraft)

1. Demonstration of effects of simulated engine failure – recognition of yaw and roll; engine instrument indications (in straight and level flight, climbing; descending; turning)
2. Student to control yaw and roll and identify failed engine while instructor simulates engine failures
3. Full engine failure and recovery procedure, when instructor simulates engine failures:
   a. Control of yaw, roll and speed
   b. Power increase; drag reduction
   c. Failed engine identification
   d. Failed engine securing
   e. Flight path management and activation of contingency procedures
4. Manage the aircraft after surprise engine cuts
5. Manoeuvring the aircraft with OEI (One Engine Inoperative)
6. Demonstration of drag factors

INSTRUCTORS COMMENTS

Figure 11: Lesson 2 extract from JSF Training Procedures Manual.

** NOTE ** - Aircraft will not climb with gear and flaps extended.

SIMULATED SINGLE ENGINE OPERATION

Simulated engine failure of a multi-engine aircraft is the most dangerous form of training a pilot is likely to experience. It is recommended that in order to remain proficient, the pilot should practice single-engine operation periodically, and only with an experienced multi-engine instructor. Simulated engine failure should be performed at an altitude that will allow enough room for safe recovery (5000 ft min. terrain clearance is recommended) should control of the airplane be lost.

Airspeed .... Less Than 125 mph (109 kt)
Left Engine Throttle .... Retard
Right Engine .... Full Power
Rudder .... Toward Operating Engine
Aileron .... Bank 5 Degrees Into Operating Engine
Turn-and-Bank Indicator .... Displace Ball 1/2 Ball Width Toward Operating Engine
Left Engine Propeller .... Feather
Maintain Airspeed Above V_{SSE} .... 97 mph (84 kt)

** NOTE **

Figure 12: Simulated single engine operation extract from the Piper PA30 Pilot Operational Handbook (POH).

1.19 Useful or Effective Investigation Techniques

1.19.1 None.

2. ANALYSIS

2.1. General

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

2.2. Crew

2.2.1 The instructor had the Airline Transport Pilot Licence (ATPL) with the instructors rating endorsed. He had flown a total of 3846.3 hours and had 148.4 hours on type.

2.2.2 The student pilot was practising asymmetric exercises, and this was her first exercise in the circuit. She had flown a total of 268.4 hours and had 10.4 hours on type. She was practising for an upcoming CPL test when the accident occurred.

2.3. Mission

2.3.1 On their third circuit during the take-off roll, the student pilot increased power in order to achieve rotational speed. The aircraft accelerated along the runway and, as it reached 80kts, the student pilot rotated. However, the aircraft pulled sharply to the right due to the right engine not providing thrust. The instructor indicated that he observed the right-side RPM indicator fluctuating, and he took over control from the student pilot. The aircraft's height was very low, and the instructor was unable to recover from the right-side bank (which the aircraft was in at the time). The instructor had tried to feather the affected engine, but he did not get the desired results. The aircraft impacted the ground with the right-side wing first, and then ground-looped and skidded backwards before coming to rest 120m beyond the runway's threshold

2.3.2 During the investigation, the instructor and the student pilot stated that they were practising asymmetric circuit when the accident occurred. From the evidence collected and the explanation given by JSF (via email), it is evident that the instructor and the student pilot were not practising single engine take-offs because these exercises require that the right propeller be feathered (as required by the Piper PA30, see Figure 12), thus, the pilot-in-command (instructor) would not have been affected by a sudden jerk (of the aircraft) to the right. Both propellers on Figures 3 and 4 were not feathered, which supports the statement sent by JSF (via email) and the statement given by the crew. The instructor stated that on completion of the asymmetric exercise, the engine placed on idle is brought back to life during the final leg in the circuit at a height of not less than 300 feet; thereafter, a normal landing is carried out.

2.3.3 The investigation revealed that an incorrect throttle control cable end fitting was fitted to the aircraft's right-side engine which separated on the third circuit as the student pilot applied full power. This resulted in the aircraft, while flying very low, to pull sharply to the right and to roll in the same direction before impacting the ground with the right wing.

2.3.4 The AMO which fitted an unapproved throttle control cable end fitting without a ball joint retainer had ceased operation on 31 October 2018. The installation of the unapproved part was in contravention of the manufacturer's SB 515 and Civil Aviation Regulation Part 43.02.22

2.4 Environment

2.4.1 The weather was not a factor and, thus, did not contribute to this accident.

3 CONCLUSION

3.1 General

From the available evidence, the following findings, causes and contributing factors 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.
- **Causes –** are actions, omissions, events, conditions, or a combination thereof, which led to this accident.
- **Contributing factors –** are actions, omissions, events, conditions, or a combination thereof, which, if eliminated, avoided or absent, would have reduced the probability of the accident or incident occurring, or mitigated the severity of the consequences of the accident or incident. The identification of contributing factors does not imply the assignment of fault or the determination of administrative, civil or criminal liability.

3.2 Findings

3.2.1 The instructor was issued an Airline Transport Pilot Licence (ATPL) on 13 June 2018 with an expiry date of 30 June 2019. The licence was endorsed with Grade II instructor rating. He was also issued a Class 1 medical certificate on 12 May 2018 with an expiry date of 31 May 2019.

3.2.2 The student pilot was issued a Private Pilot Licence (PPL) on 21 September 2018 with an expiry date of 30 September 2020. She was also issued a Class 1 medical certificate on 14 September 2018 with an expiry date of 30 September 2019.

3.2.3 The aircraft was issued a Certificate of Airworthiness (AoC) on 23 November 2018 with an expiry date of 31 December 2019.

3.2.4 The weather was not a factor and did not contribute to this accident.

3.2.5 The last annual inspection was carried out on 23 November 2018 at 6279.9 hours and the aircraft had accumulated a further 39.3 hours since its last maintenance.

3.2.6 The ATO No: SACAA/1033/ATO Johannesburg School of Flying (JSF) was providing training in accordance with the requirements of Part 141 of the CAR 2011 as amended. The ATO approval certificate was issued on 24 November 2017 with an expiry date of 28 February 2022. According to training operations specifications, JSF was approved in June 2013 to offer CPL courses and multi-engine rating.

3.2.7 The accident flight was for asymmetric circuit exercises, and it was on the second circuit that the throttle control cable end fitting failed during take-off run, resulting in reduced power and the aircraft failing to climb after rotation.

3.2.8 Both the left- and right-side engines were subjected to a teardown inspection by the newly appointed AMO to determine the RPM fluctuations. Visual inspection revealed no anomalies on engine number 1 (left-side engine). On engine number 2 (right-side engine), visual inspection revealed that the throttle control cable end fitting was missing. It was later located in the wreckage and it was not the original equipment fitted by the manufacturer.

3.2.9 The AMO did not follow the manufacturer's SB 515 issued on 17 January 1977 which states that all Piper PA30 twin Commanche with serial numbers 30 - 1 to 30 - 2000 must be installed with a control cable ball joint retainer. The ZS-ICB serial number is 30 - 1977 and was not fitted with the ball joint retainer. The installation of the unapproved part was in contravention of the manufacturer's SB 515 and Civil Aviation Regulation Part 43.02.22

3.2.10 The left-side engine throttle control cable end fitting was fitted with the ball joint retainer as mandated by SB 515, however, the right-side engine was fitted with the incorrect throttle control cable end fitting.

3.2.11 The right-side throttle cable end fitting that had failed was fitted on 24 July 2018 by AMO 009 which ceased operation on 31 October 2018.

3.2.12 The investigation revealed that an incorrect throttle control cable end fitting was fitted to the aircraft's right-side engine which separated on the third circuit as the student pilot applied full power. This resulted in the aircraft, while flying very low, to pull sharply to the right and to roll in the same direction before impacting the ground with the right wing.

3.3 Probable Cause/s

3.3.1 The right-side engine did not develop power due to separation of an incorrect throttle control cable end fitting when the student pilot applied full power to initiate climb after touch-and-go during asymmetric circuits.

3.4 Contributory Factors:

3.4.1 Fitment of an unapproved throttle control rod.

3.4.2 None compliance to the manufacturer's SB 515 requirements and Civil Aviation Regulations Part 43.02.22

4 SAFETY RECOMMENDATIONS

4.1. General

The safety recommendations listed in this report are proposed according to paragraph 6.8 of Annex 13 to the Convention on International Civil Aviation and are based on the conclusions listed in heading 3 of this report; the AIID expects that all safety issues identified by the Investigation are addressed by the receiving States and organisations.

4.2. Safety Recommendation/s

4.2.1 It is recommended that the Director of Civil Aviation mandate that all aircraft maintained by the AMO that were fitted with unapproved parts during engine maintenance be inspected within a reasonable timeframe to ascertain if the approved throttle control cable end fittings were fitted to the engines.

4.2.2 It is recommended that the Director of Civil Aviation mandate SB 515 an issue Airworthiness Directive (AD).

5. APPENDICES

5.1 AMO closing letter – Appendix A

5.2 JSF – Training operations specifications – Appendix B

This Report is issued by:

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

Appendix A

PLACO

29th October 2018

S.A. CAA

Attention : Mr. P. Kunene

Dear Mr. Kunene,

This serves to inform SA CAA that Placo (Pty) Ltd AMO009 is finishing up with its operations as of the 31st October 2018.

We would like to take this opportunity to thank the SA CAA for all their services and help to this AMO over the years.

Yours truly,

PLACO (PTY) LTD
Accountable Manager

Mr. C.M.J. Barata
Accountable Manager

Appendix B

EMPIC ISSUE # 1

TRAINING OPERATIONS SPECIFICATIONS

ATO NO SACAA/1033/ATO

OLD ATO NO: CAA/0030

JOHANNESBURG SCHOOL OF FLYING

has obtained the privilege to provide and conduct the following training courses and to use the following resources:

Approved Course	Date of Approval	Approved Course	Date of Approval
PPL (A)	June 2013	Radio Telephony (Restricted)	June 2013
CPL - (Modular - A)	June 2013	Class rating – SEA (L)	June 2013
Flight Instructor (A)	June 2013	Class rating – MEA (L)	June 2013
Instrument Rating (A)	Sept 2017	Night Rating (A)	June 2013
FSTD (IOS)	Feb 2020	Examination Centre	Oct 2017
Radio Telephony (General)	May 2017		

Area/s of Operations
Rand Airport

Restrictions and/or Limitations
None.

Aircraft/FSTD/Other Training Devices					
Type	**Registration**	**Certification**	**Type**	**Registration**	**Certification**
C152	ZS-MOX	Standard NML	C172	ZS-SVH	Standard NML
C172	ZS-MOC	Standard NML	C172	ZS-KSF	Standard NML
C172	ZS-STX	Standard NML	PA28	ZS-KBW	Standard NML
C172	ZS-TFU	Standard NML	PA28	ZS-STA	Standard NML
C172	ZS-KCZ	Standard NML	PA28	ZS-JZS	Standard NML
C172	ZS-NBN	Standard NML	PA28R	ZS-ICY	Standard NML
C172	ZS-SHR	Standard NML	PA34	ZS-NBI	Standard NML

Nominated Post Holders	
Accountable Manager	Christopher Panayiotou
Head of training: (Chief instructor)	Martin Breedt
Responsible Person: Aircraft	Hans Fouche
Safety Officer	Margo Louise Fourie
Quality Manager	Claudine Henstock

Operations Specifications Approval		
	Johan Nimand Senior Manager: Personnel Licensing Civil Aviation Authority	2 8 FEB 2020
Signature	**Name in Block Letters**	**Effective Date:**
Senior Manager Personnel Licensing	**SACAA/1033/ATO-1** **ATO Certificate No: PEL 00599**	**CAA/PEL/OPSPEC:000001387**

CAA/PEL/OPSPEC 0000001387

ISSUING AUTHORITY; SOUTH AFRICANCIVIL AVIATION AUTHORITY
E-mail: PEL.Training@caa.co.za

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