SOUTH AFRICAN CIVIL AVIATION AUTHORITY

Section/division **Accident and Incident Investigations Division** Form Number: CA 12-55

LIMITED INVESTIGATION ACCIDENT REPORT

Reference Number	CA18/2/3/10078						
Classification	Accident	**Date**	16 November 2021	**Time**	1915Z		
Type of Operation	Training (Part 141)						
Location							
Place of Departure	Cape Town International Airport (FACT), Western Cape Province	Place of Intended Landing	Cape Town International Airport (FACT), Western Cape Province				
Place of Occurrence	Apron area at Cape Town Flying Club						
GPS Co-ordinates	Latitude	S33° 58'.16. 93"	Longitude	E018°36'.15.55"	Elevation	151 feet	
Aircraft Information							
Registration	ZS-KBK						
Model/Make	Piper PA-28-161 Warrior II (Serial Number: 28-7716255)						
Damage to Aircraft	Substantial	Total Aircraft Hours	5370.6				
Pilot-in-command							
Licence Valid	Yes	Gender	Male	Age	31		
Licence Type	Airline Transport Pilot Licence (ATPL)						
Total Hours on Type	382.9	Total Flying Hours	4900.4				
People On-board	2 + 0	Injuries	0	Fatalities	0	Other (On Ground)	0
What Happened							

On Wednesday evening, 16 November 2021, a flight instructor and a student pilot on-board a Piper PA28-161 aircraft with registration ZS-KBK were preparing for a night navigation training flight from Cape Town International Airport (FACT) with the intention to return to FACT. The visual flight rules (VFR) flight plan was filed with FACT briefing and the weather condition on the day was reported to be favourable. According to the flight instructor, before the attempted training flight, he had conducted a training flight with another student on ZS-KBK aircraft; the duration of the flight was 1.9 hours. After landing at FACT, they taxied the aircraft to the aviation training organisation (ATO) facility and parked at the apron. There were no defects recorded in the flight folio. Approximately 35 minutes after the first training flight, the flight instructor had a safety briefing with the student pilot in preparation for the night navigation training flight which was planned to last for two hours.

Records indicated that the student pilot had accumulated 65.7 hours total time on all aircraft and 47.3 hours on type. Following the briefing, the pair walked to the apron to conduct a pre-flight

inspection. Nothing abnormal was noted on the aircraft. The aircraft had 36 US gallons of Avgas LL100 fuel in the tanks. After completing the pre-flight inspection, the duo boarded the aircraft. According to the flight instructor, the student pilot followed the engine start-up procedure as outlined in the Pilot's Operating Handbook (POH) and cranked the engine, but it did not start. They then allowed the engine starter to cool down before they attempted a second start. Again, the engine was cranked, but did not start. Soon after, the flight instructor saw flames coming out of the lower engine cowling area.

The fire intensified and the flight instructor instructed the student pilot to stop cranking the engine. The flight instructor took control of the situation and switched off the electrics, leaned the fuel mixture, closed the throttle and switched off the ignition. The flight instructor took the hand-held Halon fire extinguisher bottle in the cockpit and evacuated the aircraft together with the student pilot. The flight instructor tried to pull the fire extinguisher bottle safety pin to remove it (so as to activate it), but without success; the safety pin on the top of the fire bottle was stuck. The duo shouted 'fire' three times. Close by, there was another aircraft that had already started up; the pilot from that aircraft switched off the engine and brought over his aircraft's fire extinguisher, pulled the safety pin to remove it and squeezed the handle to release the extinguishing agent; the fire was extinguished. Shortly after, the aerodrome Aircraft Rescue and Fire-fighting (ARFF) team arrived at the apron and secured the scene. After the scene was secured, the flight instructor actioned the ATO emergency response plan (ERP) by informing all the relevant role players about the accident. The aircraft sustained substantial damages, however, none of the occupants was injured.

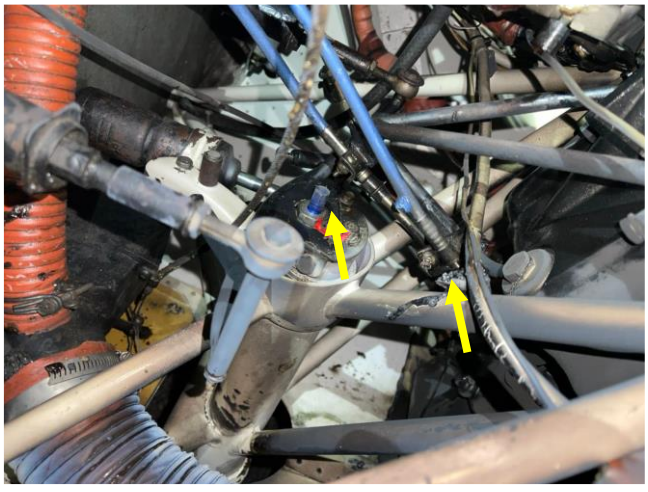

Figure 1: Some melted wiring post-accident. (Source: Operator).

The aircraft maintenance organisation (AMO) examined the aircraft after the accident and the technical report indicated that the fuel system was tested, and no leaks or incorrect operations were found or noted. The fire burnt mainly the hoses and electrical wiring situated along the right-side of the engine, as well as the engine mount. Fire damage was also noted at the base of the bottom and top cowlings.

Figures 2/3: Fire damage at the top and bottom cowlings. (Source: Operator).

The source of fire in the engine compartment was likely to have been caused by excessive fuel pumped into the carburettor venturi by the carburettor accelerator pump, which operates when the throttle lever is advanced forward. The induction of fuel into the engine relies on airflow to move fuel upwards into the engine inlet manifold. However, if the engine is stopped when the throttle lever is advanced, excess fuel will drip downwards from the carburettor and pool in the carburettor heat box. The heat radiated by the hot exhaust system could then cause the pooled fuel to vaporise and could also act as an ignition source for the fuel vapour.

Post-accident examination of the aircraft maintenance records and other documentation revealed no abnormalities or defects, and showed that the aircraft was certificated, equipped and maintained in accordance with existing regulations and approved procedures. Examination of the aircraft's flight folio indicated no open or differed maintenance items listed before the accident flight.

Procedure to start the engine when hot as outlined in the POH:

1. *Open the throttle approximately ½ inch*
2. *Turn the master switch ON*
3. *Turn the electric fuel pump ON*
4. *Put mixture control in full RICH*
5. *Engage the starter by rotating magneto switch clockwise and pressing in. When the engine fires move the throttle to desired setting*.

Probable cause:

It is likely that during engine start, the pilot most probably over-primed the engine, causing excess fuel to drip down and collect in the heat box. As the engine was still hot, it resulted in fuel vapour catching fire.

Contributary factor:

Incorrect engine start technique.

Safety Action/s

None.

Safety Message and/or Safety Recommendation/s

None.

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

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