SOUTH AFRICAN CIVIL AVIATION AUTHORITY

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

LIMITED SERIOUS INCIDENT INVESTIGATION REPORT

Reference Number	CA18/3/2/1399				
Classification	Serious Incident	**Date**	25 April 2022	**Time**	1140Z
Type of Operation	Private (Part 94)				
Location					
Place of Departure	Diemerskraal Aerodrome, Western Cape Province	Place of Intended Landing	Springbok Aerodrome (FASB), Northern Cape Province		
Place of Occurrence	Private Farm, 2nm north-east of Moorreesburg, Western Cape Province				
GPS Co-ordinates	Latitude	33˚07'03.62" S	Longitude	18˚41'53.27" E	Elevation	629 feet
Aircraft Information					
Registration	ZU-DND				
Model/Make	Team Rocket F1 (TRF1) (Serial Number: 38)				
Damage to Aircraft	None	Total Aircraft Hours	448.5		
Pilot-in-command					
Licence Type	Private Pilot Licence (PPL) Aeroplane	Gender	Male	Age	58
Licence Valid	Yes				
Total Hours on Type	35.10	Total Flying Hours	1 448.8		
People On-board	1+1	Injuries	0	Fatalities	0	Other (on ground)	0

What Happened

On 25 April 2022 at 1120Z, a pilot and a passenger on-board a TRF1 aircraft with registration ZU-DND took off on a private flight from Diemerskraal Aerodrome, Western Cape province, with the intention to land at Springbok Aerodrome (FASB), Northern Cape province. No flight plan was filed for the flight. The flight was conducted under the provisions of Part 94 of the Civil Aviation Regulations (CAR) 2011 as amended.

The pilot stated that the aircraft climbed to 6 500 feet above mean sea level (AMSL) and after approximately 20 minutes in cruise phase, he checked-in with Air Force Base Langebaanweg Aerodrome (FALW) approach on frequency 122.50-Megahertz (MHz). The aircraft was still configured at a high-power setting of 75%. Moments later, the pilot noticed an abrupt drop in engine manifold air pressure (MAP) and a decrease in revolutions per minute (RPM). He immediately notified FALW that his aircraft was experiencing engine problems. The pilot elected to turn around towards the direction of Porteville Airfield which was located 10 nautical miles (nm) east of his flight path near Moorreesburg, but soon realised that he was not going to reach the airfield after noticing

that the aircraft was rapidly losing height as it was descending at a rate of between 1 500 and 2 500 feet per minute (ft/m) as per the data on the vertical speed indicator. He then tried to fix the anomaly by switching between the tanks, turning the auxiliary fuel pump, and adjusting the throttle settings, but this did not rectify the problem. The engine continued to run at limited power. The pilot informed FALW that he will be executing an emergency landing on the road on the private farm ahead of his path, which was located 2nm north-east of Moorreesburg. The aircraft landed uneventfully. The pilot and the passenger were not injured.

Figure 1: The baffle seal of the engine induction filter housing. (Source: Pilot)

What was found:

- The pilot was issued a Private Pilot Licence (PPL) on 17 December 2021 with an expiry date of 31 December 2023. The pilot was issued a Class 2 medical certificate on 25 October 2021 with an expiry date of 30 September 2022 with no medical waivers.

- The last annual inspection of the aircraft was conducted on 20 October 2021 at 441.9 airframe hours. The Certificate of Release to Service (CRS) was issued on 20 October 2021 at 441.9 hours with an expiry date of 19 October 2022 or at 541.9 hours, whichever comes first. The Authority to Fly (ATF) was initially issued on 14 November 2019; and the current ATF had an expiry date of 30 November 2022.

- The Certificate of Registration was issued to the present owner on 6 July 2005.

- According to the pilot, during the last annual inspection, which was conducted on 20 October 2021, it was found that the valve guide vanes on the two front cylinders were out of specification and needed to be replaced. The aircraft was flown to an approved person (AP) in December 2021 for this task to be carried out. The two front cylinders were removed and sent to the engine shop in Johannesburg. After the repairs were completed, the aircraft was

collected by the pilot on 4 April 2022. Due to the replacement of the valves and piston rings, the aircraft was to be flown at a high-power setting of approximately 2 400 rpm and at 24 inches manifold pressure for the piston rings and valves to seat. The pilot flew approximately 40 minutes along the east coast before returning to Diemerskraal. On 16 April 2022, another flight was conducted at a high-power setting for approximately 1 hour and 30 minutes. The aircraft performed well.

- After the (current) emergency landing incident, the pilot inspected the aircraft and noticed that the air passage on the inlet scoop was partially blocked by the baffle seal which was sucked in and restricting normal passage of air into the engine. (The baffle seal is located between the cowling and the engine induction filter housing.) The air filter was also unsteady in its housing. The pilot contacted the AP to inspect the aircraft, whereafter, a temporary repair was carried out by removing the seal to bring the aircraft into a serviceable state so it could be flown out of the private farm. A ground-run was carried out and the aircraft was declared safe to fly back to the departure airfield. The baffle seal was installed on 1 July 2005 when the aircraft was manufactured, and it is an on-condition item.

- At the time of flying the aircraft from the private farm to Diemerskraal Aerodrome after the emergency landing, the pilot did not have a special flight permit as required by the CAR Part 24. 02.4 (1d).

- A day after the incident, the aircraft was flown to an aircraft maintenance organisation (AMO) in Cape Town for permanent repairs to be carried out. It was determined that the baffle seal be removed permanently as it did not have any effect on the engine's performance. The misalignment of the filter was also rectified. The defects were duly signed off on the airframe logbook and the aircraft was released back to service. The AMO was issued an AMO certificate on 30 May 2021 with an expiry date of 30 April 2022

- According to the Lycoming Engine Manual, the aircraft should be operated at 65% to 75% power to ensure seating of the rings following overhaul (see extract below).

- A post-incident airworthiness assessment was conducted by an inspector from the Regulator. Based on the maintenance documentation submitted pertaining to the rectification of the defect to restore the airworthiness of the aircraft, permission was granted to resume normal operations utilising the privileges of the current Authority to Fly for the remainder of its calendar time.

NOTE: (Source: Lycoming Engine Manual Chapter 4)

Cruising should be done at 65% to 75% power until a total of 50 hours has accumulated or oil consumption has stabilized. This is to ensure proper seating of the rings and is applicable to new engines, and engines in service following cylinder replacement or top overhaul of one or more cylinders.

Special flight permit Part 24.02.4

(1) The Director or the organisation designated for the purpose in terms of part 149 of these regulations, as the case may be, may issue a special flight permit.

(2) A special flight permit for an aircraft may be issued for the purposes of—

(a) ferrying an aircraft, where the authority to fly has become invalid, to a base where maintenance can be carried out;

(b) delivering or exporting the aircraft;

(c) evacuating the aircraft from areas of impending danger;

(d) carrying out a flight or a series of flights while the aircraft does not conform to the appropriate airworthiness design standards referred to in regulation 24.01.2; or

(e) operation of an aircraft at a mass in excess of its maximum certificated take-off mass for flights beyond the normal range over water or over land areas where adequate landing facilities or appropriate fuel is not available. The excess mass that may be authorised under this subregulation is limited to the additional fuel, fuel-carrying facilities, and navigation and emergency equipment necessary for the flight.

(3) An application for the issuing of a special flight permit for an aircraft or an amendment thereto, shall be made on the prescribed form.

(4) A special flight permit issued in terms of this part shall be valid only for flights within the borders of the Republic and over international waters. For flights over or within the territory of another State permission of the responsible aeronautical authority is required.

Probable cause

A dislodged baffle seal blocked the air passage on the inlet scoop, restricting air flow to the engine for proper combustion. This resulted in loss of engine power, followed by a successful emergency landing.

Safety Action

As a safety action, the AMO determined that the absence of the baffle seal did not have any impact on the engine's performance, therefore, a decision was made to remove it permanently. The removal of the baffle seal was approved by the original builder, according to the AMO.

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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This report is issued by:

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