

LIMITED OCCURRENCE INVESTIGATION REPORT – FINAL

Reference Number	CA18/2/3/1048						
Classification	Accident		Date	30 January 2025		Time	1530Z
Type of Operation	Private (Part 94)						
Location							
Place of Departure	Margate Aerodrome (FAMG), KwaZulu-Natal Province		Place of Intended Landing		Ladysmith Aerodrome (FALY), KwaZulu-Natal Province		
Place of Occurrence	On a farm, about 25 kilometres (km) west of Howick in KwaZulu-Natal Province						
GPS Co-ordinates	Latitude	29°40'03.0" S	Longitude	29°57' 25.2" E	Elevation	5 070 feet	
Aircraft Information							
Registration	ZU-SPS						
Make; Model; S/N	Thunderbird MKII (Serial Number: TDE-71)						
Damage to Aircraft	Substantial			Total Aircraft Hours	656		
Pilot-in-command							
Licence Type	Private Pilot Licence		Gender	Male		Age	52
Licence Valid	Yes	Total Hours	930.5		Total Hours on Type	70.9	
Total Hours 30 Days	25.4		Total Hours on Type Past 90 Days		25.4		
People On-board	1 + 0	Injuries	0	Fatalities	0	Other (on ground)	0
What Happened							
On Thursday, 30 January 2025, a pilot on-board a Thunderbird MKII aircraft with registration ZU-SPS was engaged in a private flight from Margate Aerodrome (FAMG) to Ladysmith Aerodrome (FALY), both in KwaZulu-Natal province. The flight was conducted under visual meteorological conditions (VMC) by day and under the provisions of Part 94 of the Civil Aviation Regulations (CAR) 2011 as amended. The pilot stated that he performed a pre-flight inspection of the aircraft, and no anomalies were detected. The aircraft had 75 litres (L) of Octane 95 Unleaded fuel mixed with two-stroke oil in the tank which equated to about 3.5 hours endurance. He then started the engine and allowed it warm up until the engine indications were within the normal operating range (green arch) with positive fuel flow. Thereafter, the pilot taxied the aircraft to the threshold of Runway 05 and selected the flaps to first notch in preparation for departure. At 1205Z, the pilot opened the throttle to 6 500 revolutions per minute (RPM) and commenced with the take-off run. The aircraft rotated and climbed to 1 500 feet (ft) above ground level (AGL). After levelling off, he retarded the throttle to 6 200 RPM, cruising at 75 miles per hour (mph). About 25 kilometres (km) west of Howick and one (1) hour to FALY, the engine ran rough and lost power; moreover, the RPM dropped from 6200 to 6000 RPM.							

The pilot turned on the auxiliary fuel as he thought the engine was receiving insufficient fuel to restore the RPM, however, the issue could not be resolved. The pilot elected to perform a forced landing on a farm. After the aircraft had come to a stop, the pilot switched off the master switch and fuel supply before he vacated the aircraft; he was not injured. The aircraft sustained substantial damage during the forced landing.



Figure 1: Aerial view of the accident site. (Source: Google Earth)



Figure 2: The aircraft at the accident site. (Source: Pilot)

Aircraft Description (Source: Thunderbird MKII Pilot's Operating Handbook [POH])

The Thunderbird MKII features a strut-braced high-wing, two-seats-in-side-by-side configuration open cockpit, fixed tricycle landing gear and a single engine in tractor configuration. As a conventional 3-axis light sport aircraft (LSA), the Thunderbird MKII does not rely on pilot weight shift to affect control. Twin seats are positioned side by side for full dual control and both crew members are well protected from the weather by an aerodynamic fibreglass pod and large wrap-around windshield. The cockpit is very similar to that of a helicopter with excellent forward visibility as well as on both sides. Several important designs are incorporated into the Thunderbird MKII, which include a two-cylinder, two-stroke, Rotax 582 engine, with serial number 5381691 rated at 64 horsepower (hp). The engine has auxiliary fuel pumps and fuel air mixture is fed from the manifold to the twin carburettors. The aircraft's maximum take-off weight (MTOW) is 450 kilograms (kg). It is equipped with a 75L fuel tank capacity, of which 3L is unusable.

Meteorological Information

The weather information in the table below was obtained from the pilot questionnaire.

Wind Direction	030°	Wind Speed	5 knots	Visibility	9999 m
Temperature	20°C	Cloud Cover	3/8	Cloud Base	3 000ft AGL
Dew Point	Unknown	QNH	Unknown		

Post-accident Investigation

The wreckage was examined by the approved person (AP) at the accident site. The propeller was undamaged which was consistent with the engine not delivering power (see Figure 3). The engine controls were properly fitted to the carburettors. The engine was removed from the airframe and transported to the AP's facility at Brakpan Aerodrome (FABB) in Gauteng province for further investigation. A sample of the fuel from the fuel filters was tested; it contained water and contaminants of an unknown origin. The filters were clogged and had restricted the flow of fuel to the engine (fuel starvation) which resulted in loss of power. Fuel in the filters was consistent with Octane 95 Unleaded fuel mixed with two-stroke oil. The pilot stated that the fuel into the tank was purchased from an automotive filling station in Margate on 29 January 2025.



Figure 3: Closer view of the aircraft showing the undamaged propeller. (Source: AP)



Figure 4: The filters and contaminated fuel. (Source: AP)

Findings	
1.	<u>Personnel Information</u>
1.1	The pilot had a Private Pilot Licence (PPL) that was initially issued by the Regulator (SACAA) on 19 May 2005. The licence was reissued on 2 February 2023 with an expiry date of 28 February 2025. The pilot had flown a total of 930.5 hours of which 70.9 hours were on the aircraft type.
1.2	The pilot had the aircraft type endorsed on his licence.
1.3	The pilot had a Class 2 aviation medical certificate that was issued on 31 January 2024 with an expiry date of 31 January 2025. The pilot was restricted to wearing suitable corrective lenses for defective distant vision (VML) when flying.
2.	<u>Aircraft Information</u>
2.1	The aircraft was maintained by an approved person (AP) under the Approved Person Scheme at the Aero Club of South Africa. The last 100-hour annual inspection that was conducted on the aircraft before the accident flight was certified on 18 October 2024 at 632.5 airframe hours. The aircraft was flown a further 23.5 hours since the annual inspection.
2.2	The aircraft had a valid Authority-to-fly (ATF) Certificate that was initially issued on 20 January 2023. The latest ATF was issued on 18 November 2024 with an expiry date of 19 January 2026.
2.3	The aircraft's Certificate of Registration (C of R) was issued to the present owner on 12 August 2022.
2.4	The aircraft was issued a Certificate of Release to Service (CRS) on 18 October 2024 with an expiry date of 17 October 2025 or at 732.5 airframe hours, whichever occurs first.
2.5	The ratio used to mix the amount of fuel (75L) on-board the aircraft was conducted in accordance with (IAW) the Rotax Operator's Manual which recommended 500 millilitres (ml) of oil to every 25L of Octane 95 Unleaded fuel replenished.
Probable Cause(s)	
Engine loss of power caused by contaminated fuel; subsequently, an unsuccessful forced landing was conducted on a farm.	
Contributing Factor(s)	
Inadequate pre-flight inspection.	

Safety Action(s)
None.
Safety Message
None.
About this Report
<i>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 desktop inquiries 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.</i> <i>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.</i>
Purpose
<i>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.</i>
Disclaimer
<i>This report is produced without prejudice to the rights of the AIID, which are reserved.</i>

This report is issued by:

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