

LIMITED OCCURRENCE INVESTIGATION REPORT – FINAL

Reference Number	CA18/2/3/10530						
Classification	Accident	Date	26 November 2024	Time	1545Z		
Type of Operation	Private (Part 91)						
Location							
Place of Departure	Mequatling Private Farm, Free State Province		Place of Intended Landing	Mequatling Private Farm, Free State Province			
Place of Occurrence	Open field with tall grass						
GPS Co-ordinates	Latitude	28° 58' 11.3" S	Longitude	027° 021' 31.7" E	Elevation	5255 ft	
Aircraft Information							
Registration	ZS-RZK						
Make; Model; S/N	Robinson R44; Raven II (Serial Number: 11041)						
Damage to Aircraft	Destroyed		Total Aircraft Hours	2170.4			
Pilot-in-command							
Licence Type	Commercial Pilot Licence		Gender	Male	Age	54	
Licence Valid	Yes	Total Hours	3576.2		Total Hours on Type	942.8	
Total Hours 30 Days	2.4		Total Flying on Type Past 90 Days	8.6			
People On-board	1+1	Injuries	0	Fatalities	0	Other (on ground)	0
What Happened							
<p>On 26 November 2024, a pilot and a passenger on-board a Robinson R44 Raven II helicopter with registration ZS-RZK took off on a game culling operation from Mequatling Farm to a nearby game farm with the intention to land back at the take-off farm. Visual meteorological conditions (VMC) by day prevailed at the time of the flight which was conducted under the provisions of Part 91 of the Civil Aviation Regulations (CAR) 2011 as amended.</p> <p>A pre-flight inspection of the helicopter was conducted, and no abnormalities were noted. The helicopter took off and, whilst en route to the game farm, the passenger felt nauseated and asked if the pilot could land the helicopter. The pilot landed the helicopter in a small clearing amongst the bushes (see Figure 1). Upon landing, the pilot did not shut down the engine; he remained seated in the cockpit whilst the passenger disembarked quickly from the helicopter with the intention of creating a clear distance from the rotating main rotor blades and where he could throw up. As the passenger turned around, he noticed smoke emanating from the helicopter's rear, near the exhaust. He then signalled to the pilot by pointing to the back of the helicopter whilst shouting "fire" and as he ran towards the helicopter.</p> <p>The pilot handed the fire extinguisher to the passenger to exterminate the fire as he began the shutdown procedure. After shutting down the helicopter, with the main rotor blade still rotating slowly, the pilot disembarked from the helicopter to assist the passenger to extinguish the fire. However, the fire extinguisher depleted before the fire could be put out. The pair opted to use bottled water as well as their jackets to put out the fire, but their attempts were in vain. The fire soon spread and engulfed the helicopter, which was destroyed. The pilot and the passenger were not injured.</p>							



Figure 1: The helicopter engulfed in flames. (Source: Operator)

The picture above was taken by the pilot after all their efforts to extinguish the fire were exhausted. The fire also rapidly spread across a large portion of the accident site.



Figure 2: The wreckage. The blue circle shows the exhaust tailpipe (blue circle), and the red circle depicts the exhaust pipeline (red circle) with no shield and muffler.

Figure 3 is a depiction of a similar Robinson R44 helicopter with registration ZS-RKK which suffered the same fate on 8 September 2024 after it landed on tall, dry grass in North West province. The exhaust, which was hot, ignited the grass whereafter the fire engulfed and destroyed the helicopter.

The investigation (to this accident) revealed that there was no compliance with Service Bulletin-46 (SB-46) as the muffler and the tailpipe shield were not fitted to the helicopter.

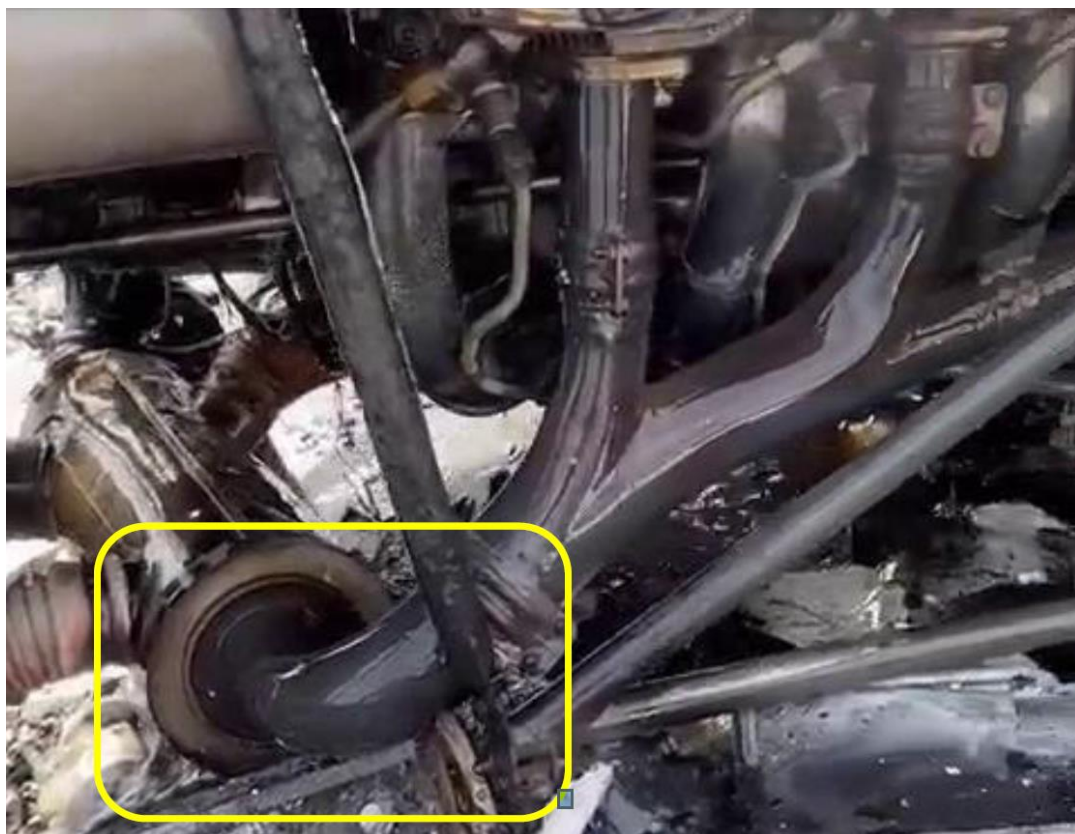


Figure 3: Similar exhaust system to the accident helicopter. (Source: Report CA18/2/3/10364)

The helicopter's maintenance records, including the airframe and powerplant logbooks, flight folio and the mandatory periodic inspection (MPI) work pack were reviewed and found to be in order. The Airworthiness Directives (ADs) and SBs were also reviewed and it was found that SB-46 which was issued by the helicopter manufacturer on 15 November 2002 was not complied with. The SB, which applies to all owners, operators, and service centres of R44 recommended that a D318 muffler and a tailpipe shield be installed on R44 helicopters with serial numbers ranging from 0001 to 1265. The objective of this SB is to reduce the risk of fire igniting during landing in areas covered with dense dry grass.

The investigating team was informed that the accident helicopter was equipped with this kit during manufacture in 2008. Therefore, the SB-46 was not considered in the helicopter's maintenance records. The attachment clamps found at the mounting positions of the muffler and tailpipe confirmed the above statement. A review of the helicopter type in relation to the serial number range of the affected helicopters revealed that the kit was installed but there was no reference to it in the maintenance records. Additionally, a review of other helicopter types with the same serial number showed that these helicopters were also equipped with the kit during manufacture, yet there was no mention of it in their maintenance records.

According to the Pilot's Operating Handbook (POH), Section 10, Safety Tips and Notices: Safety Tip 15: *"Do not land in tall dry grass. The exhaust is low to the ground and very hot; a grass fire may be ignited."*

Safety Notice SN-17 states: "NEVER LAND IN TALL DRY GRASS, the engine exhaust is very hot and can easily ignite tall grass or brush."

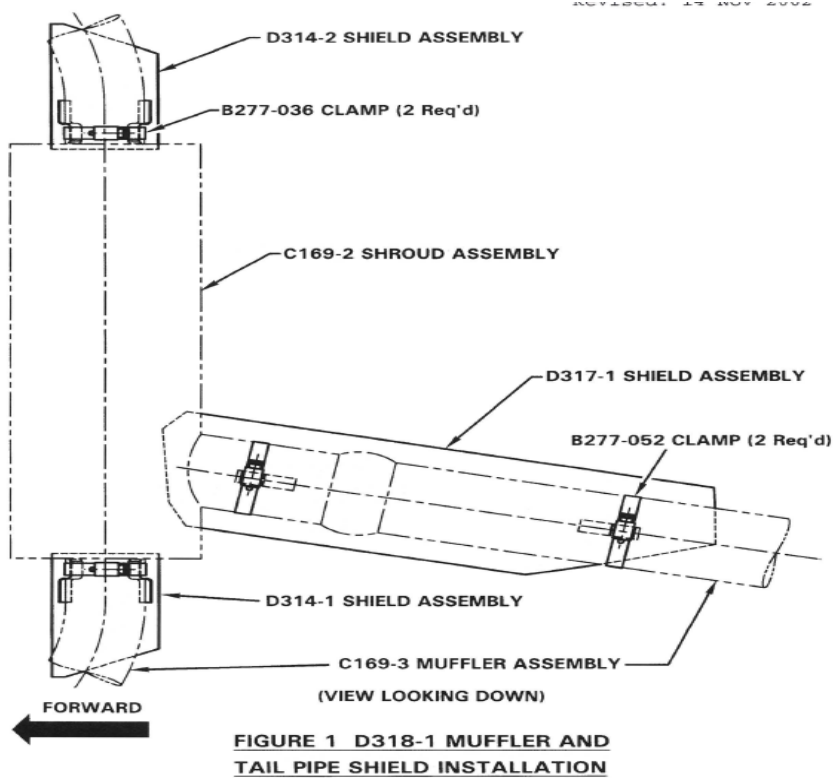


Figure 4: Schematics of the muffler and the tail pipeline shield installation.

Figures 5 and 6 show a R44 helicopter type fitted with both the muffler and the tailpipe shield kits.



Figure 5: The muffler shield on the right side of the helicopter (left) and a muffle taken from a different angle (right).



Figure 6: The red window shows a tailpipe shield.

Previous records of similar occurrences on different aircraft were also noted.

On 3 September 1997, a Robinson R44 helicopter with registration ZS-REJ was destroyed by fire when the pilot landed on tall, dry grass at a farm near Dendron. A similar occurrence on record occurred on 18 August 2000 when a Robinson R44 helicopter with registration ZS-RFB was destroyed in similar circumstances at a farm near Vaalwater. These two occurrences prompted the helicopter manufacturer to issue the SB-46 on 15 November 2002.

Findings

1. The pilot had a Commercial Pilot Licence (CPL) that was initially issued by the Regulator (SACAA) on 26 March 2010. The CPL was reissued on 23 January 2024 with an expiry date of 31 March 2025. The pilot's Class 1 aviation medical certificate was issued on 25 November 2024 with an expiry date of 30 November 2025.
2. The pilot had a total of 3576.2 hours of which 942 hours were accrued on the helicopter type. The pilot was properly licensed and certified to undertake the flight.
3. The helicopter had a valid Certificate of Airworthiness (C of A) that was issued by the Regulator on 3 February 2024 with an expiry date of 28 February 2025. The Certificate of Registration (C of R) was issued to the current owner on 27 March 2015.
4. The latest mandatory periodic inspection (MPI) of the aircraft was conducted and a Certificate of Release to Service (CRS) was issued on 17 July 2024 at 2151.2 airframe hours with an expiry date of 16 July 2025 or at 2200 airframe hours, whichever comes first. The helicopter had a total of 270.4 airframe hours at the time of the accident. The helicopter was certified and serviceable at the time of the flight.
5. The aircraft maintenance organisation (AMO) that conducted the mandatory service on the helicopter had an AMO Certificate that was issued on 24 October 2023 with an expiry date

of 31 October 2024. The helicopter type was endorsed on the AMO's operational specification.

6. The muffler and tailpipe shield kit were installed on the accident helicopter during manufacture; therefore, the SB-46 did not apply to this helicopter type. The helicopter was landed on tall grass which was ignited by the hot exhaust; the fire rapidly spread and engulfed the helicopter. This action violated Safety Tip: 15 which was issued by the helicopter manufacturer advising against landing in areas with tall, dry grass. Although the grass appeared green at the time of landing, the hot exhaust, despite being installed with a kit, was still capable of igniting the vegetation. The fire ultimately destroyed the helicopter.

7. This accident could have been prevented if the helicopter was landed in a safer area. The pilot focused on landing the helicopter and disregarded Safety Tip 15 (issued by the manufacturer) which advises pilots against landing on areas with tall, dry grass.

Probable Cause(s)

The helicopter landed on a tall, grass-covered area after the passenger experienced motion sickness. The hot exhaust ignited the grass, and the fire spread quickly and engulfed the helicopter, destroying it.

Contributing Factor(s)

Disregard of the manufacturer's Safety Tip 15, which advises landing on tall, dry grass.

Safety Action(s)

None.

Safety Message and/or Safety Recommendation/s

Safety message:

1. It would be beneficial for operators to provide passengers with motion sickness bags as part of their standard briefing.

2. Operators are strongly encouraged to strictly adhere to the safety tips that are issued by the manufacturers on specific aircraft/helicopter types, as well as consistently follow standard operating procedures to ensure the safety of the occupants and the aircraft/helicopter.

About this Report

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 desk top enquiries 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.

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

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.

Disclaimer

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**This report is issued by:
Accident and Incident Investigations Division
South African Civil Aviation Authority
Republic of South Africa**