

**LIMITED OCCURRENCE INVESTIGATION REPORT – FINAL**

<b>Reference Number</b>	CA18/2/3/10364						
<b>Classification</b>	Accident	<b>Date</b>	8 September 2023	<b>Time</b>	1040Z		
<b>Type of Operation</b>	Private (Part 91)						
<b>Location</b>							
<b>Place of Departure</b>	Rietfontein Farm Rustenburg District, North West Province		<b>Place of Intended Landing</b>		Prins Farm Rustenburg District, North West Province		
<b>Place of Occurrence</b>	Prins Farm Rustenburg District, North West Province						
<b>GPS Co-ordinates</b>	<b>Latitude</b>	25°26'05.10" S	<b>Longitude</b>	026°52'55.43" E	<b>Elevation</b>	3 560 ft	
<b>Aircraft Information</b>							
<b>Registration</b>	ZS-RKK						
<b>Make; Model; S/N</b>	Robinson Helicopter; R44 Raven II (Serial Number: 11338)						
<b>Damage to Aircraft</b>	Destroyed		<b>Total Airframe Hours</b>		2 080.0		
<b>Pilot-in-command</b>							
<b>Licence Type</b>	Private Pilot Licence		<b>Gender</b>	Male		<b>Age</b>	47
<b>Licence Valid</b>	No	<b>Total Hours</b>	4 800.0		<b>Total Hours on Type</b>	4 800.0	
<b>Total Hours 90 Days</b>	60.0		<b>Total Flying on Type Past 90 Days</b>			60.0	
<b>People On-board</b>	1 + 0	<b>Injuries</b>	0	<b>Fatalities</b>	0	<b>Other (on ground)</b>	0
<b>What Happened</b>							
<p>On Friday morning, 8 September 2023 at 1030Z, a pilot on-board a Robinson R44 Raven II helicopter with registration ZS-RKK took off from Rietfontein Farm in the North West province to Prins Farm in the same province. 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>The pilot stated that the flight time from Rietfontein Farm to Prins Farm was approximately 10 minutes. He landed the helicopter on a tall grass-covered area near the animal feed area (see Figure 2) to inspect some antelope. Approximately 5 seconds after he shut down the helicopter, he noticed flames underneath the helicopter; the tall dry grass had ignited on contact with the hot exhaust system. The pilot attempted to extinguish the fire by using the portable fire extinguisher that was on-board the helicopter, but it had no effect. When he realised that the fire was getting out of control, he moved to a safe distance as he anticipated a possible explosion. He was later assisted by a local farmer and, together, they doused the field fire. However, the helicopter was destroyed. No person was injured during the accident.</p> <p>The accident occurred during daylight at Global Positioning System (GPS) co-ordinates determined to be 25°26'05.10" South 026°52'55.43" East, at an elevation of 3 560 feet (ft).</p>							

A still picture from the video footage indicated the absence of the exhaust muffler and tailpipe shielding.



**Figure 1:** The helicopter on fire. (Source: Pilot)



**Figure 2:** A still picture extracted from a video footage with the helicopter and dry grass on fire.



**Figure 3:** A still picture taken from a video footage of the exhaust system whilst the fire was being doused.

## Findings

### 1. Personnel Information

- 1.1 The pilot had a Private Pilot Licence (PPL). His licence was initially issued on 7 December 2011. His last skills test was valid from 18 August 2021 to 31 August 2023. The pilot had flown a total of 4 800.0 hours on the helicopter type, according to the pilot questionnaire (form CA 12-03).
- 1.2 The pilot was issued a Class 2 aviation medical certificate on 13 September 2021 with an expiry date of 31 August 2022. His aviation medical certificate was, therefore, not valid at the time of the accident. Thus, the pilot did not meet the provisions of Part 67.00.9 of the existing regulations, rendering his licence invalid.
- 1.3 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 state: *"NEVER LAND IN TALL DRY GRASS, the engine exhaust is very hot and can easily ignite tall grass or brush."*
- 1.4 The pilot did not follow the safety tip or the safety notice referenced in paragraph 1.3.

### 2. Aircraft Information

- 2.1 The last maintenance inspection that was conducted on the helicopter prior to the accident flight was certified on 9 May 2023 at 2 062.7 airframe hours. Since the maintenance inspection, a further 17.3 hours were flown on the helicopter.
- 2.2 The helicopter had a valid Certificate of Airworthiness (C of A) that was initially issued on 25 August 2006 with an expiry date of 31 August 2024. The helicopter was airworthy when it dispatched for the flight.
- 2.3 The helicopter's Certificate of Registration (C of R) was issued to the present owner on 18 March 2022.
- 2.4 The helicopter was issued a Certificate of Release to Service (CRS) on 9 May 2023 with an expiry date of 8 May 2024 or at 2 162.7 airframe hours, whichever occurs first.

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SERVICE BULLETIN SB-46

**DATE:** 15 November 2002

**TO:** All R44 Owners, Operators, and Service Centers

**SUBJECT:** D318-1 Muffler and Tailpipe Shield Installation

**ROTORCRAFT AFFECTED:** R44 Helicopters S/N 0001 thru 1269.

**TIME OF COMPLIANCE:** Within next 100 flight hours or by 1 March 2003, whichever occurs first.

**BACKGROUND:** RHC has received reports of R44 helicopters igniting tall, dry grass or brush during off-airport landings. The D318-1 shield installation provides shields below the exhaust collectors and tailpipe to reduce the chance of a grass fire. Appropriate caution should still be exercised with the shields installed (reference Safety Tip 15 and Safety Notice SN-17 in Pilot's Operating Handbook).

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**COMPLIANCE PROCEDURE:**

Order KI-165 kit from RHC Customer Service and install D318-1 shield installation per kit instructions.

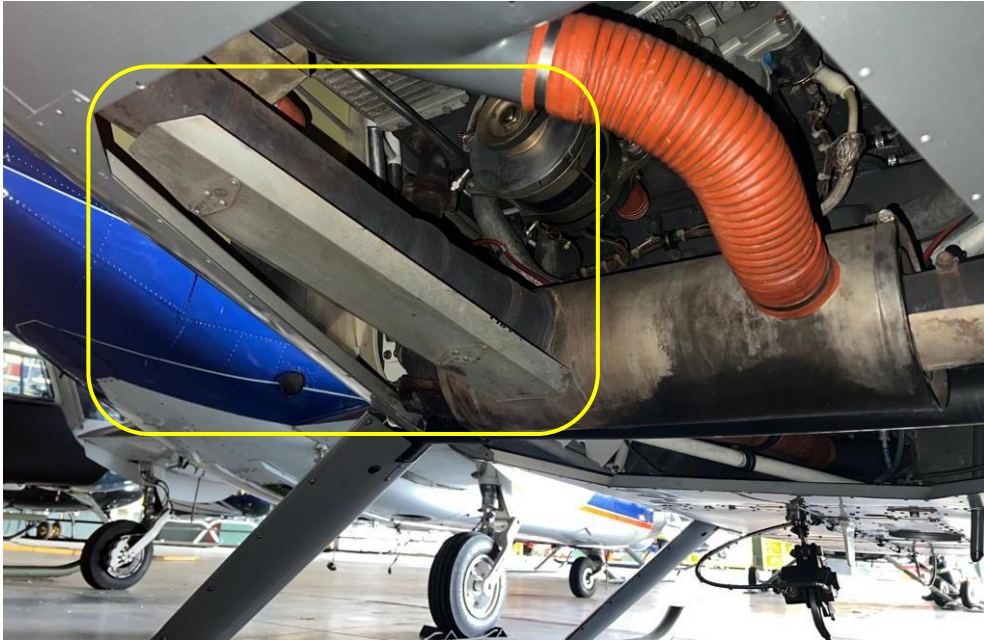
**Approximate Cost:**

**Parts:** No charge if ordered by 1 March 2003. Order must include helicopter serial number.

**Labor:** 1.0 man-hour.

- 2.5 The Service Bulletin SB-46 dated 15 November 2002, which require the installation of the exhaust Muffler and Tailpipe Shield Kit D318-1, was not complied with.
- 2.6 According to the pilot, the flight folio was in the helicopter and was consumed by the fire.
- 2.7 It was noted that the pilot's door (right front) as well as the cabin door (behind the pilot) were removed for the purpose of this flight.
- 2.8 The helicopter was involved in a serious incident on 11 May 2022 (Accident and Incident Investigations Division (AIID) Reference number CA18/3/2/1386) during a game capture operation when the weights on the net that is fired using a net gun on-board the helicopter damaged one of the main rotor blades. The pilot landed safely following the occurrence.

2.9 According to AIID records, 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 happened on 18 August 2000 when a Robinson R44 helicopter with registration ZS-RFB was also destroyed in similar circumstances at a farm near Vaalwater. These two occurrences prompted the helicopter manufacturer to issue the Service Bulletin SB-46 on 15 November 2002.



**Figure 4:** The tailpipe shield in the yellow window.



**Figure 5:** The muffler shield (right side) in the yellow window.



**Figure 6:** A different view of the muffler shield.

### 3. Meteorological Information

3.1 The weather information in the table below was obtained from the pilot questionnaire (form CA 12-03).

Wind Direction	No wind	Wind Speed	Nil	Visibility	9999 m
Temperature	35°C	Cloud Cover	Nil	Cloud Base	CAVOK
Dew Point	Unknown	QNH	Unknown		

3.2 Fine weather conditions prevailed at the time of the flight. The weather had no bearing to this accident.

#### **Probable Cause**

The pilot landed the helicopter on tall dry grass which ignited on contact with the hot exhaust; the helicopter was consumed by the fire.

#### **Contributing Factor(s)**

1. The pilot disregarded the safe operation of the helicopter by landing on tall dry grass whilst being aware that the helicopter was not equipped with the Muffler and Tailpipe Shield Kit as per the SB-46 and whilst he understood the risks associated with such landing conditions.
2. The pilot ignored Safety Tip 15 and Safety Notice SN-17 in Section 10 of the POH by not choosing a safe suitable area to land.

<b>Safety Action(s)</b>
None.
<b>Safety Message and/or Safety Recommendation/s</b>
It is recommended to the Director of Civil Aviation to issue a mandatory compliance directive to ensure all Robinson R22 and R44 helicopters operating in South Africa are fitted with the Muffler and Tailpipe Shield Kit as per Service Bulletin SB-46 to prevent a recurrence of this accident and the destruction of property associated with such an occurrence.
<b>About this Report</b>
<p><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 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.</i></p> <p><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></p>
<b>Purpose</b>
<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>
<b>Disclaimer</b>
<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**