

**LIMITED OCCURRENCE INVESTIGATION REPORT – FINAL**

<b>Reference Number</b>	CA18/2/3/10255						
<b>Classification</b>	Accident	<b>Date</b>	22 November 2022	<b>Time</b>	0615Z		
<b>Type of Operation</b>	Remotely Piloted Aircraft Systems - Agriculture (Part 101)						
<b>Location</b>							
<b>Place of Departure</b>	Mansfield Farm, Kokstad, KwaZulu-Natal Province		<b>Place of Intended Landing</b>	Mansfield Farm, Kokstad, KwaZulu-Natal Province			
<b>Place of Occurrence</b>	3.68nm east of Bhongweni, near Kokstad in KwaZulu-Natal Province						
<b>GPS Co-ordinates</b>	Latitude	30°30'29.8" S	Longitude	029°29'13.7" E	Elevation	4176ft	
<b>Aircraft Information</b>							
Registration	ZT-XHF						
Make; Model; S/N	DJI Phantom; 4 RTK (Serial number: 0V2SJ5CRA40257)						
Damage to Aircraft	Substantial		Total Aircraft Hours	77.16			
<b>Pilot-in-command</b>							
Licence Type	Remote Pilot Licence (RPL)		Gender	Male	Age	27	
Licence Valid	Yes	Total Hours	307.56	Total Hours on Type	48.18		
Total Hours Past 30 days	14.50		Total Hours on Type Past 90 days			35.48	
<b>People Controlling</b>	1	<b>Injuries</b>	0	<b>Fatalities</b>	0	<b>Other (on ground)</b>	0
<b>What Happened</b>							
<p>On 22 November 2022, a pilot was operating a remotely piloted aircraft (RPA) DJI Phantom 4 with registration ZT-XHF for agricultural mapping around Mansfield Farm in Kokstad, KwaZulu-Natal province when the accident occurred. The flight was conducted beyond visual line of sight (BVLOS) by day and under the provisions of Part 101 of the Civil Aviation Regulations (CAR) 2011 as amended.</p> <p>The pilot conducted the pre-flight inspection, and there were no anomalies detected. The task was planned to be conducted at a height of 80 metres (m) (263 feet [ft]) above ground level (AGL).</p> <p>The pilot launched the RPA which climbed to 250ft before it reached the horizontal flight starting point. The RPA then dipped, spiralled uncontrollably and lost height as it descended towards the ground and crashed. The pilot stated that he did not make any inputs prior to the start of the accident sequence of events. The RPA sustained substantial damage during the accident.</p>							



**Figure 1:** ZT-XHF at the accident site. (Source Operator)

Post-accident inspection revealed that the front right motor had stopped operating, and there was a build-up of black residue around four of the battery connector pins. Further inspection revealed black residue on the battery connectors and cable connectors to the battery. The cause of the black residue was attributed to an electric short circuit between the battery connectors and the cable connectors to the battery.

#### **Findings**

1. The pilot was issued a Remote Pilot Licence (RPL) on 4 October 2021 with an expiry date of 31 October 2023. His Class 3 medical certificate was issued on 30 July 2021 with an expiry date of 30 July 2025 with no medical restrictions.
2. The Mandatory Periodic Inspection (MPI) carried out on the RPA prior to the accident flight was conducted on 9 September 2022 at 65.50 airframe hours, with the next MPI due at 85.50 airframe hours. The RPA was operated a further 11.66 hours after the last inspection.
3. The RPA was issued a Remotely Piloted Aircraft System Letter of Approval (RLA) on 20 September 2022 with an expiry date of 13 September 2023.

<p>4. Weather conditions as per the pilot questionnaire were as follows: surface wind, light and variable; clouds, none; temperature, 19°C; dew point, 06°C; visibility, greater than 10km.</p> <p>5. The operator was issued an RPAS Operating Certificate (ROC) with an endorsement of Part 101 by the Regulator (SACAA) on 29 April 2022.</p> <p>6. The RPA's front right motor ceased to operate due to an electrical short circuit which was caused by the RPA cable connection to the battery.</p> <p>7. It is likely that the RPA cable connectors were not properly secured to the battery, which resulted in the electric short.</p>
<p><b>Probable Cause</b></p> <p>One of the RPA's front motors ceased to operate due to an electric short which caused the RPA to lose control and spiral down until it crashed on the ground.</p>
<p><b>Contributing Factors</b></p> <p>Improper connection of the cables to the battery connectors.</p>
<p><b>Safety Action</b></p> <p>None.</p>
<p><b>Safety Message</b></p> <p>RPA pilots should ensure proper connection of batteries during the pre-flight inspection to avoid damage to RPA and/or property.</p>
<p><b>About this Report</b></p> <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>
<p><b>Purpose</b></p> <p><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></p>
<p><b>Disclaimer</b></p> <p><i>This report is produced without prejudice to the rights of the AIID, which are reserved.</i></p>

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