

LIMITED OCCURRENCE INVESTIGATION REPORT – FINAL

Reference Number	CA18/2/3/10199						
Classification	Accident	Date	2 August 2022		Time	0852Z	
Type of Operation	Remotely Piloted Aircraft (Part 101)						
Location							
Place of Departure	Gamsberg Mine, Northern Cape		Place of Intended Landing		Gamsberg Mine, Northern Cape		
Place of Occurrence	Overhead Tailings Dam in Gamsberg Mine						
GPS Co-ordinates	Latitude	29° 11' 51.9" S	Longitude	18° 56' 46.5" E	Elevation	3080 ft	
Aircraft Information							
Registration	ZT-XDC						
Make; Model; S/N	DJI; Matrice 200 (Serial Number: 0FZDFAP0P30036)						
Damage to Aircraft	Destroyed			Total Aircraft Hours	28.3		
Pilot-in-command							
Licence Type	Remote Pilot Licence (RPL)		Gender	Male		Age	20
Licence Valid	Yes	Total Hours	15.9	Total Hours on Type	5.5		
Total Hours Past 90 days	5.5		Total Hours on Type Past 90 days	5.5			
People Controlling	1 + 0	Injuries	0	Fatalities	0	Other (on ground)	0
What Happened							
<p>On 2 August 2022, a pilot operating a remotely piloted aircraft (RPA) DJI Matrice 200 with registration ZT-XDC launched the RPA on a surveillance flight at Gamsberg Mine in the Northern Cape province. 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 stated that this was the last surveillance flight over Tailings Dam in Gamsberg Mine. He was flying the RPA in a manual grid pattern when he noticed that the batteries were at approximately 43%. He then activated the Return-to-Home (RTH) button to command the RPA to return to the last recorded home point, which was the pilot's position. The pilot was continuously monitoring the RPA via the remote-control screen, and whilst it was approximately 428 metres (m) away from the launch position, the RPA began to shake violently. He immediately searched for the RPA visually and observed it spiralling (right) towards the ground. He then switched back to the manual remote control of the RPA and attempted to stop the RPA's descent by applying the left control stick (controls up and downwards movement) but to no avail. The pilot did not observe any warning signals on the remote control; only the RTH audio was audible as the RPA spiralled until it impacted the ground.</p> <p>The RPA was destroyed during the accident sequence; no person on the ground was injured.</p>							



Figure 1: The wreckage of the RPA as found on site. (Source: Operator)



Figure 2: An aerial view of the accident site. (Source: Google Earth)

Findings

1. The pilot was issued a Remote Pilot Licence (RPL) on 10 May 2022 with an expiry date of 30 April 2024. His Class 3 medical certificate was issued on 13 September 2021 with an expiry date of 30 September 2025 with no medical restrictions.
2. The mandatory periodic inspection (MPI) carried out on the RPA prior to the accident flight was conducted on 27 May 2022 and was certified at 18.51 airframe hours. During the MPI, the propulsion system was inspected, and the motor had no signs of abnormal sound when operated. Also, the motor shaft was rigid with no play. The RPA operated a further 9.79 hours after the inspection.

<p>7. Electronic Speed Controllers (Source: Unmanned Systems Technology)</p> <p><i>The electronic speed controllers (ESC) are devices that allow drone flight controllers to control and adjust the speed of the aircraft's electric motors. A signal from the flight controller causes the ESC to raise or lower the voltage to the motor as required, thus, changing the speed of the propeller.</i></p>
<p>Probable Cause</p> <p>It is likely that the RPA experienced a failure of one of the electronic speed controllers (ESC), resulting in an uncontrolled right spin descent and impact with the ground.</p>
<p>Contributing Factor/s</p> <p>None.</p>
<p>Safety Action</p> <p>None.</p>
<p>Safety Message and/or Safety Recommendation/s</p> <p>None.</p>
<p>About this Report</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>Purpose</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>Disclaimer</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
Republic of South Africa**