SOUTH AFRICAN CIVIL AVIATION AUTHORITY

Section/division **Accident and Incident Investigations Division** Form Number: CA 12-57

LIMITED ACCIDENT INVESTIGATION REPORT

Reference Number	CA18/2/3/10109								
Classification	Accident	**Date**	21 January 2022	**Time**	1752Z				
Type of Operation	Remotely Piloted Aircraft (Part 101)								
Location									
Place of Departure	Glencore Tweefontein Complex, Mpumalanga Province	Place of Intended Landing	Glencore Tweefontein Complex, Mpumalanga Province						
Place of Accident	Glencore Tweefontein Coal Mines, Mpumalanga Province								
GPS Co-ordinates	Longitude	S 26°01'05.5"	Latitude	E 029°08'01.1"	Elevation	5275ft			
Aircraft Information									
Registration	ZT-WAX								
Model/Make	DJI Matrice 200 (M200)/DJI Company (Serial Number: M200-07)								
Damage to Aircraft	Destroyed	Total Aircraft Hours	1544						
Pilot-in-command									
Licence Type	Remote Pilot Licence	Gender	Male	Age	24				
Licence Valid	Yes								
Total Hours on Type	222.57	Total Flying Hours	1493.47						
People On-board	0	Injuries	0	Fatalities	0	Other (on ground)	0		

What Happened

On 21 January 2022 at about 1752Z, a DJI Matrice 200 (M200) drone with registration ZT-WAX was on a surveillance flight at Glencore Tweefontein Coal Mines in Emalahleni District, Mpumalanga province. The drone was operated by a pilot who was stationed at Glencore Tweefontein complex offices. The operation was conducted under the provisions of Part 101 of the Civil Aviation Regulations (CAR) 2011 as amended.

The pilot reported that while he was investigating the unusual heat signature using the drone's infrared camera, he lowered the drone closer to the object and discovered that it was a bale of hay. Soon after, the drone spiralled down and disconnected from the controller's signal and, subsequently, crashed. The pilot then rushed to the crash site where he recovered the drone wreckage which was fairly localised within a radius of five metres.

According to post-accident technical troubleshooting report, the drone experienced an electronic speed control (ESC) failure during operation, which caused either one or two of the motors to overspeed or drop speed. This led to the drone spiralling down due to speed imbalance. The same failure had since been experienced with other drones of the same type. These drone types are being phased out since January 2021. Drones are designed with a default return-to-origin launch point upon losing the controller's signal as well as ground proximity sensor function that prevents

an un-commanded landing; however, the attitude at which the accident drone crashed overrode the ground proximity sensor function, and the drone was damaged beyond repair.

The pilot had a Remote Pilot Licence (RPL) issued by the Regulator (SACAA) on 2 February 2021 with an expiry date of 28 February 2023. His Class 3 medical certificate was issued by the Regulator on 29 October 2021 with an expiry date of 31 October 2025. The pilot is qualified for the flight operation and his licence is endorsed as a multirotor drone operator. The pilot had a total of 1493.47 drone operating hours of which 222.57 hours were on the drone type.

The drone was issued a letter of approval (LOA) by the Regulator on 29 January 2021 with an expiry date of 31 January 2022. The drone was registered in the Regulator's registry on 17 July 2019. The drone had operated approximately 1544 flight hours since new at the time of accident. The operator had an operating certificate issued by the Regulator on 25 October 2021 with an expiry date of 31 October 2022.

Probable Cause

The drone experienced an electronic speed control failure, which led to the drone spiralling out of control and crashing as a result of speed imbalance. The drone type had a known defective electronic speed control.

Safety Action/s

None.

Safety Message and/or Safety Recommendation/s

None.

Purpose of the Investigation

In terms of Regulation 12.03.1 of the Civil Aviation Regulations (CAR) 2011, 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****.*

About this Report

Decisions regarding whether to investigate, and the scope of an investigation are based on many factors, including the level of safety benefit likely to be obtained from an investigation. For this occurrence, no 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 brief report. The report has been compiled using information supplied in the initial notification, as well as follow-up information 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 accident.

This report provides an opportunity to share safety message/s in the absence of an investigation.

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.

Disclaimer

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