



REPUBLIC OF NAMIBIA

MINISTRY OF WORKS AND TRANSPORT

**Directorate of Aircraft Accident and Incident
Investigations**

Accident Reference: ACCID/071620/01-02

Aircraft Accident Investigation Final Report

V5-HVD NEAR HEJA LODGE

Aircraft Accident Report

Helicopter Collision with Terrain
Private Flight
Mc. Donnell Douglas, 1997 MD 600N Helicopter,
V5-HVD near Heja lodge, Windhoek
16th July 2020

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Foreword

This report presents the factual information, data analysis, conclusions, and safety recommendations reached during the investigation. The purpose of the investigation was to establish the circumstances surrounding this accident.

In accordance with the provisions of Annex 13 to the Convention on International Civil Aviation Organization, the accident's analysis, conclusions, and safety recommendations contained therein are intended neither to apportion blame nor to single out any individual or group of individuals. The main objective was to identify the systematic deficiencies and draw lessons, from the occurrence, which might help to prevent accidents and incidents in the future. To this end, many a time, the reader may be interested in whether or not an issue was a direct cause of the accident (that has already taken place), whereas the investigator is mainly concerned with the prevention of future accidents/incidents.

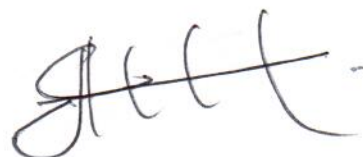
As a result, the usage of this report for any purpose other than (the latter and spirit of Annex 13 and other relevant statutes) prevention of similar occurrences in the future might lead to erroneous interpretations and applications.

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ABBREVIATION

AD	-	Airworthiness Directives
AMO	-	Aircraft Maintenance Organization
AME	-	Aircraft Maintenance Engineer
AIP	-	Aeronautical Information Publication
AOC	-	Air Operating Certificate
CPL	-	Commercial Pilot License
DAAII	-	Directorate of Aircraft Accident and Incident Investigation
ELT	-	Emergency Locator Transmitter
ECU	-	Engine Control Unit
FADEC	-	Full authority digital engine control
ICAO	-	International Civil Aviation Organization
NTSB	-	National Transportation Safety Board
NCAA	-	Namibia Civil Aviation Authority
MHZ	-	Megahertz
MOE	-	Maintenance Organization Exposition
NAMCARs	-	Namibian Civil Aviation Regulations
NCAA		Namibian Civil Aviation Authority
NTSB	-	National Transportation Safety Board
PPL	-	Private Pilot License
MPI	-	Mandatory Periodic Inspection
SB	-	Service Bulletins
UTC	-	Universal Time Co-ordinated
VHF	-	Very Higher Frequency





Ministry of Works and Transport

DIRECTORATE OF AIRCRAFT ACCIDENT AND INCIDENT INVESTIGATION ACCIDENT REPORT – EXECUTIVE SUMMARY

Aircraft Registration	V5-HVD	Date of Accident	16 th July 2020		Time of Accident	08:33 UTC
Type of Aircraft	1997 MD 600N HELICOPTER		Type of Operation		Private	
Pilot- In - command License Type		PPL (PR 02040)	Age	48	License Valid	valid
Pilot-In-command Flying Experience		Total Flying Hours	538.6		Hours on Type	280.5
Last point of departure		Grootfontein FYGF				
Next point of intended landing		Eros Airport (FYWE)				
Location of the accident site with reference to easily defined geographical points (GPS readings if possible)						
Near Heja lodge, GPS 22 32'43.3"S 17 09'23.9 E						

Meteorological Information	Wind Direction: 080°, Wind speed: 4kts, Visibility: >10, Temperature: 9° C Dew point: -5° C, Cloud cover: None, Cloud base: CAVOK,				
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Number of people on board	1+3	No. of people injured	4	No. of people killed	0
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Synopsis

On the 16th July 2020, at around 09H00 local time a privately owned, Namibian registered helicopter got airborne from Grootfontein for a private flight to Eros Airport. On-Board were the pilot and three passengers.

The flight was uneventful for most of the 1h30 journey. At around 10h33 the pilot experienced an immediate power loss, accompanied by a loss in height, he then declared an emergency after his engine cut out. He searched for a place to conduct an emergency landing but due to the hilly area and impending power lines he was unable to make a safe landing, all control was lost and the helicopter hit the ground at a shallow angle.

The pilot and one passenger were seriously injured, the other passenger sustained minor injuries. The helicopter was destroyed.

The Directorate of Aircraft Accident and Incident Investigation (DAAII) was informed telephonically about the accident by the Air Traffic Controller. The Minister of Works and Transport was responsible for the release of the official final accident report.

The weather was fine with good visibility.

The pilot was a holder of a Helicopter Private Pilot License. His medical certificate was valid with no restrictions.

The last annual inspection was certified on 12th December 2019 at 1874.5 airframe hours. At the time of the accident, the aircraft had accumulated a further 55 hours since the last MPI was certified.

According to the records, the Aircraft Maintenance Organization (AMO) that certified the last MPI on the aircraft before the accident had a valid AMO Approval (AMO 78). The Regulatory Authority conducted an audit on the AMO at Eros Airport on the 26th of Nov 2019. All Airworthiness Directives (AD) and Service Bulletins (SB) were complied with as certified in the last MPI dated 12th December 2019.

Probable Cause: LOC-I. (Loss of Control in Flight).

Contributing factor (s):

Engine flameout.

Name of Owner : Jaco van Dyk
Manufacturer : Mc Donnell Douglas, 1997 MD 600N
Nationality : Namibian
Place : Near Heja lodge, approx. 8km from Eros Airport. GPS 22 32'43.3"S 17 09'23.9 E
Date : 16th June 2020 Time: 08:33UTC (10:33 local time)

All times given in this report are in Coordinated Universal Time (UTC).

Disclaimer:

The report is given without prejudice to the rights of the Directorate of Aircraft Accident and Incident Investigations, which are reserved.

Purpose of the Investigations:

In terms of part 74 of Civil Aviation Act 2016 (Act No.6 of 2016) and ICAO Annex 13, this report was compiled in the interest of advancing transportation safety and the reduction of risk of aviation accident or incidents and **not assign fault or determine civil or criminal liability.**

This report contains fact relating to aircraft accidents or incidents which have been determined at the time of issue. The report may therefore be revised should new and substantive facts are made available to the investigator (s).

1. FACTUAL INFORMATION

1.1 History of Flight

- 1.1.1 On the 16th July 2020, at around 07:00 UTC a privately owned, Namibian registered helicopter got airborne from Grootfontein for a private flight to Eros Airport. On-Board were the pilot and three passengers.
- 1.1.2 The flight was planned to take approximately 1 hour 30 minutes. The weather at the time of the flight was in accordance with (IAW) visual flight rules (VFR) with clear skies. There was no flight plan filed.
- 1.1.3 The flight was uneventful for most of the journey. During the approach into Windhoek, along the mountain ridges at Heja Lodge, about 6.6 miles from Eros Airport, the pilot who was in communication with Eros tower and was cleared for runway 01, just a few seconds later the pilot declared a mayday and thereafter all communication ceased. The helicopter experienced a sudden and immediate power loss accompanied by a loss in height.
- 1.1.4 The pilot searched for an area to quickly land using the auto-rotation procedure. He veered between some hills and found a relatively level area while trying to avoid high voltage power lines straight ahead. He lost control and hit the ground at a shallow angle, the aircraft hit the ground and tumbled down a ravine and came to rest halfway the cliff.
- 1.1.5 The helicopter was destroyed. The pilot and one passenger were seriously injured, the other two passengers sustained minor injuries.
- 1.1.6 DAAII immediately activated the response procedures and commenced its investigation on site. The accident site was on a steep mountain rocky ridge and challenging to access.

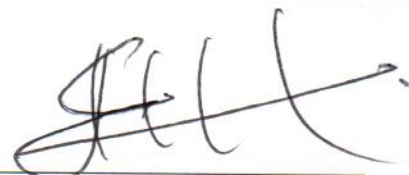




Figure 1: Flight from Grootfontein. (Google Earth)



Figure 2: Hilly region North of Windhoek (GPS track).

1.2 Injuries to Persons

Injuries	Pilot	Crew	Pass.	Other
Fatal	-	-	-	-
Serious	1	-	1	-
Minor	-	-	2	-
None	-	-	-	-

1.3 Damage to Aircraft

1.3.1 The aircraft was destroyed

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Figure 3: Aircraft before the accident



Figure 4: View of the wreckage after the accident

1.4 Other Damage

1.4.1 There was no other damage

1.5 Personnel Information

1.5.1 Pilot-in-in command

Nationality		Namibian			
Licence No	PR 02040	Gender	Male	Age	48
Licence valid		Yes	Type Endorsed	Yes	
Ratings		P1 MD 600			
Medical Expiry Date		31/ 08/ 2020			
Restrictions		None			
Previous Accidents		Unknown			

Flying Experience:

Total Hours	538.6
Total Past 90 Days	19
Total on Type Past 90 Days	19
Total on Type	280.5

1.6 Aircraft Information

The MDHI MD 600N is a single-engine, rotary-wing aircraft. The fuselage is a teardrop-shaped semi-monocoque construction and is manufactured primarily of aluminium alloy. It has no tail rotor rather an advanced NOTAR anti-torque system. The subject aircraft, V5-HVD, was manufactured in the USA in 1997. The NCAA issued a Certificate of registration on 17th Jan 2017.

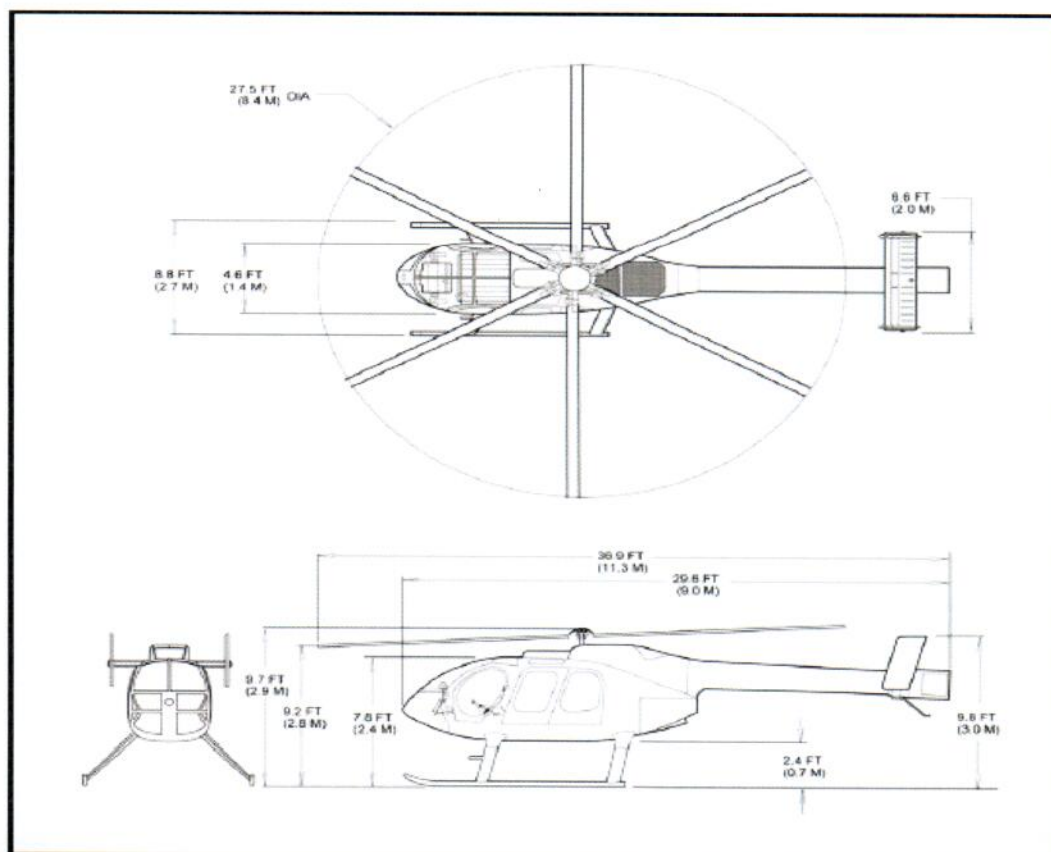


Figure 5. Helicopter description (Source: MD Helicopters. Technical description)

Airframe:

Type	MD 600N Helicopter
Serial No.	RN 005
Manufacture	Mc Donnell Douglas
Year of Manufacture	1997
Total Airframe Hours (At time of Accident)	1,938.3 hrs . Hobbs
Last MPI (Date & Hours)	12 th December 2019 at 1874.5 airframe hours
Hours since Last MPI	55 hours
C of A (Issue Date)	09 Feb 2017 valid till 11 th may 2021
C of R (Issue Date) Present owner	16 Jan 2017
Operating Categories	Standard

Engine:

The MD 600D uses a single turbine engine, which a Rolls Royce engine Model 25-C47 Turboshift and has a fully articulated six-bladed main rotor.

Type	Rolls Royce
Serial No.	CAE 847820
Hours since New	1,938.3 hours.
Hours since Overhaul	235.9

Main Rotor

Type	500 P 2300
Part no	505
S/N	599T, 596T, 601T, 600T, 598T, 597T

NB: No Tail Rotor (NOTAR Anti Torque system)

FADEC

The engine is equipped with a full authority digital engine control (FADEC) unit. This system is used to schedule fuel flow to match the power required by the pilot. The control unit gets many of its inputs Such as power level position, engine RPM compressor inlet pressure etc.

1.7 Meteorological Information

Wind direction	080°	Wind speed	4kts	Visibility	> 10
Temperature	9° C	Cloud cover	None	Cloud base	CAVOK
Dew point	-5° c				

1.8 Aids to Navigation

- 1.8.1 The aircraft was equipped with standard navigation equipment as approved by the Regulator for the helicopter type.

1.9 Communications.

- 1.9.1 The helicopter was equipped with standard communication equipment as approved by the Regulator for the helicopter type. There was no reported communication problem between the pilot and the Air

Traffic Controller.

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1.10 Aerodrome Information

The accident did not occur on an aerodrome.

Accident Site Location	Surrounding mountains near Heja lodge.
Accident Site Co-ordinates	GPS 22 32'43.3" S 17 09'23.9 E
Accident Site Elevation	1852 meters above sea level
Accident Site Surface	Rocky, sandy surface

1.11 Flight Recorders

1.11.1 The Aircraft was not equipped with a flight data recorder (FDR) or a cockpit voice recorder (CVR) nor was it required by the relevant aviation regulations.

The investigator retrieved a Garmin Global Positioning System (GPS) Unit Part no: AERA 7955 Serial no: 2D0001640. The GPS unit was sent for analysis to the NTSB recorder shop (USA).

1.12 Wreckage distribution and Impact Information

The accident occurred about 6.6 miles from Windhoek on a rocky, hilly and bushy terrain that is hard to access. It was close to high voltage power lines.

The aircraft first impact, with terrain was with left skid approximately 25° along the longitudinal axis. The initial point of ground impact was by the left skid about 1852 meters above sea level (asl). The helicopter belly impacted the ground about 11.45 meters upstream. The impact marks of the left wing tip were approximately 32m from the main wreckage. The aircraft left undercarriage ripped off first followed by the left rudder pedal unit approximately 5 meters upstream, the nose section subsequently hit the ground catapulting the helicopter forward over the ridge and coming to rest upside down halfway downhill on a huge rock approximately 3.9 meters from the top of the cliff.

All six blades exhibited warping and wrinkling of the skin and varying degrees of trailing edge separation. Varying degrees of bending at or near the root end of the blades was observed. Minimal rotational damage was observed on the blades

Due to the substantial damage to the fuselage structure, the fuel system was not examined.



Figure 8: *Depicting where the rotor blades first hit the vegetation before the helicopter tumbled downhill.*

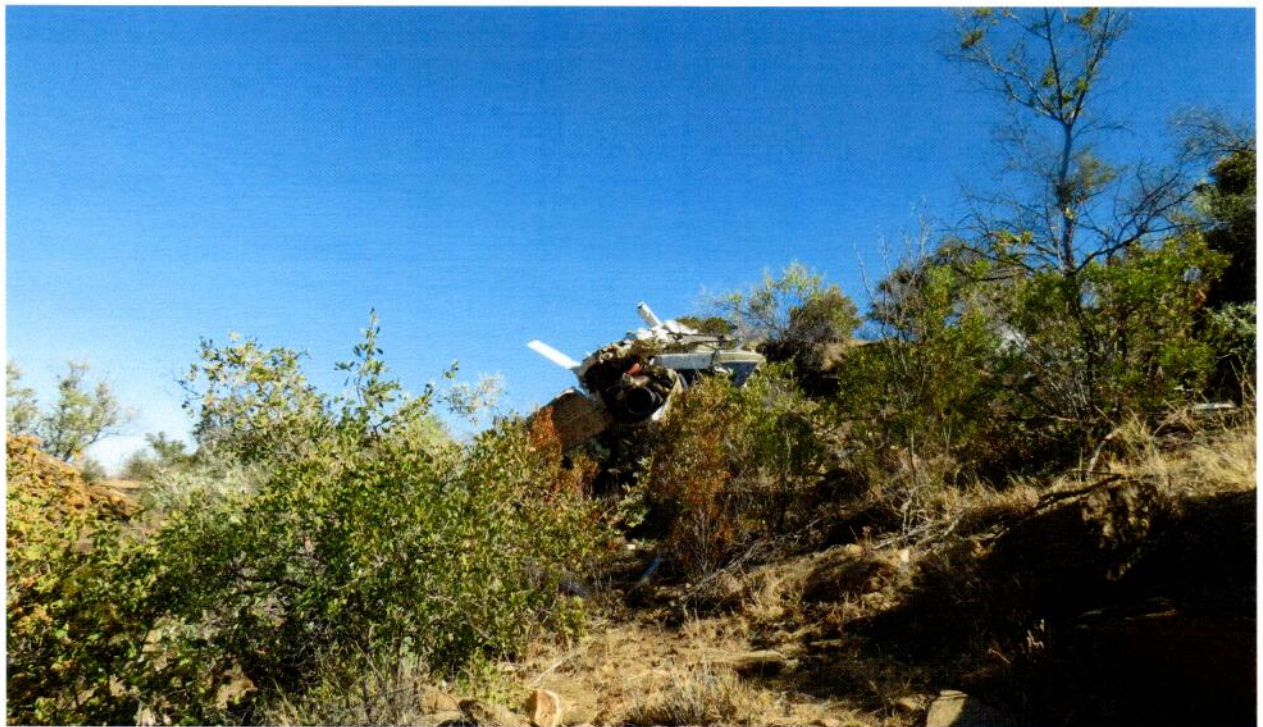


Figure 9: *Depicting the aircraft as it came to rest halfway down a steep ridge.*



JELC

Figure 10: *Depicting the wreckage site over a difficult terrain*

The main cabin was extensively compressed reducing the livable area significantly.

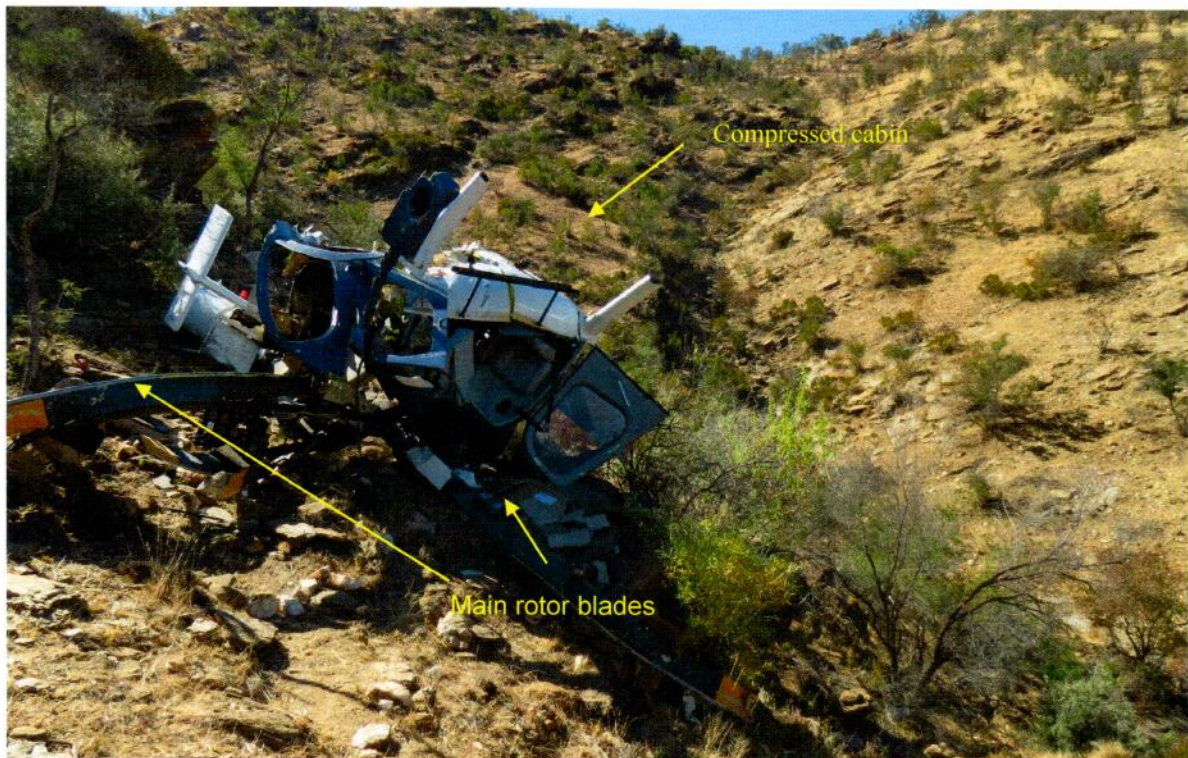


Figure 11: *Depicting the wreckage site over a difficult terrain*

1.13 Medical and Pathological Information

1.13.1. The pilot had a valid medical certificate.

1.13.2 There was no evidence that physiological factors or incapacitation affected the performance of the pilot.

1.14 Fire

1.14.1. There was no evidence of fire in flight or after the impact.

1.15 Survival Aspects.

1.15.1 The survivable space was significantly compromised. The pilot and the passenger who occupied the front seats sustained serious injuries. The occupants on the rear seat sustained minor injuries.

1.15.2 There were safety harnesses on all seats and none of these failed.

1.15.3 One of the passengers managed to call the emergency services who responded promptly.

1.15.4 The design of the aircraft, with low forward movement and all passengers being restrained adequately all these factors increase the survivability of the accident despite the extensive damage to the fuselage

1.16 Tests and Research.

1.16.1 The ECU unit was dismantled from the wreckage and sent for download in a facility approved by the Manufacturer in South Africa under the supervision of South African Civil Aviation Authority's

Accident and Incident Investigation Division (SACAA AIID). No faults or exceedances from the accident flight were found on the ECU; however, faults from previous flights were found.

- 1.16.2. The investigator also retrieved Garmin Aera 795. Global Positioning System (GPS) and sent it for NTSB recorder facility in the USA. Raw data were retrieved which was used to reconstruct the final flight path and display track, Groundspeed, GPS altitude etc.

1.17 Organizational and Management Information.

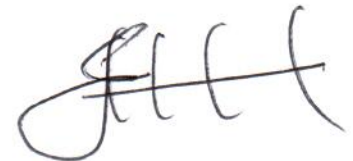
- 1.17.1. The aircraft was flown for private use.
- 1.17.2 The Aircraft Maintenance Organization (AMO) responsible for the last MPI was duly certified to carry out the required maintenance on the aircraft and was in possession of a valid AMO certificate No. 078 Valid till 25th November 2020.
- 1.17.3 The aircraft documentation was reviewed, the investigations examined document entry practices by the owner as well as the AMO.

1.18 Additional Information

- 1.18.1 None

1.19 Useful or Effective Investigation Techniques.

- 1.19.1 Not applicable.

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2. ANALYSIS

2. 1. The pilot was licensed and rated on the aircraft type to conduct the flight and was the holder of a valid medical certificate.
2. 2. The aircraft was equipped with standard navigation and communication by the regulator for the Aircraft type.
- 2.3 During the document review, the flight folio was examined. The flight folio was examined. Very few sections were populated with mandatory information such as Pilot's signature, fuel up-lift, and fuel on-board. There was very minimal information recorded on the flight folio. For three years there was barely a technical entry. The pilot in command has to ensure defects or suspected faults during operations that may affect the serviceability are recorded. The Aviation Act part 171 requires a pilot to maintain accurate entries and records.
- 2.4 The flight folio a document that is specific to each flight, is issued in triplicate of which a copy should be properly kept at the maintenance facility and one at the place of operations in case the book is lost, destroyed in a fire or otherwise. The flight folio on the accident helicopter was found with all triplicate pages dating back to 2017. The flight folio is important for trend monitoring as well as a tool for learning lessons after a mishap.
- 2.5. Propeller blade limited damage and twist were consistent with the engine not producing sufficient power on impact or the main rotor not engaged to the engine.

3. CONCLUSION

3.1 Findings

- 3.1.1 The aircraft had a valid Certificate of Airworthiness
- 3.1.2 There was no evidence of airframe failure or system malfunction prior to the accident.

- 3.1.3 Main rotor blade exhibited minimal damage relative to the airframe damage.
- 3.1.4 There was no flight plan filed.
- 3.1.5 The pilot was properly licensed, medically fit and to operate the flight.
- 3.1.6 The ECU downloads did not indicate any parameter exceedances nor any existing faults.
- 3.1.7 The flight folio was not maintained accurately as required by existing regulations.

3.2. Probable Cause/s

- 3.2.1. LOC-I. (Loss of control in flight).

3.3 Contributing factor

- 3.3.1 Engine flameout.

4.0 Safety Recommendations

None

Date: 2/3/22

Hafeni Mweshixwa
Investigator-in-Charge

Released by:


.....
Hon John Mutorwa, MP
MINISTER: MINISTRY OF WORKS AND TRANSPORT

Date: 4/3/2022