



**REPUBLIC OF NAMIBIA**

**MINISTRY OF WORKS AND TRANSPORT**

**DIRECTORATE OF AIRCRAFT ACCIDENT INVESTIGATION**

**CIVIL AIRCRAFT FINAL ACCIDENT REPORT**

**ACCID/112721/02-05**

**OPERATION : PRIVATE**

**AIRCRAFT : V5-ELZ  
REGISTRATION**

**LOCATION : EROS AIRPORT,  
NAMIBIA**

**DATE : 27 NOVEMBER 2021**





REPUBLIC OF NAMIBIA

MINISTRY OF WORKS AND TRANSPORT

Tel : (264)(61)208-8411/10  
Fax : (264)(61)208-8495  
Telex: (05-908) 811  
E-mail: Magnus.Abraham@mwt.gov.na

022

AIRCRAFT ACCIDENT INVESTIGATION  
Private Bag 12042  
Ausspannplatz  
Windhoek  
NAMIBIA

Enquiries: Magnus Abraham

Our Ref: 3/48

Date: 13 April 2022

To : Minister of Works and Transport  
Deputy Minister of Works and Transport  
ED: Ministry of Works and Transport

From : Director: Aircraft Incident and Incident Investigation

RE: CIVIL AIRCRAFT ACCIDENT REPORT

Please find attached the final report on the above subject accident. In accordance with the International Civil Aviation Organization Annex 13 – Aircraft Accident and Incident Investigation – Standard 6.13, final reports shall be published as soon as possible in the interest of accident prevention.

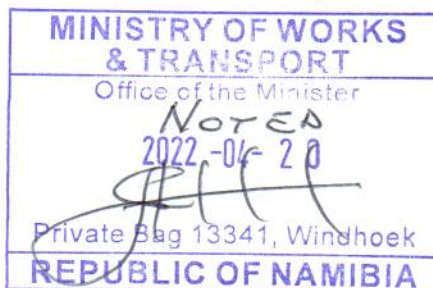
It is recommended that copies of these final reports be made available to the public and other interested parties upon request. Your approval is therefore sought to release the said report.

Magnus Abraham

**DIRECTOR: AIRCRAFT ACCIDENT AND INCIDENT INVESTIGATION**

*"Effective and Efficient Delivery of Service"*

All official correspondence must be addressed to the Permanent Secretary





## 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, and Civil Aviation Act, (act No 6 of 2016) , 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, usage of this report for any purpose other than (the latter and spirit of Annex 13 and Civil Aviation Act (Act No. 6 of 2016 or other relevant statutes) prevention of similar occurrences in the future might lead to erroneous interpretations and applications.



## ABBREVIATIONS

ACCID	-	Accident
AMO	-	Approved Maintenance Organization
NCAA	-	Namibian Civil Aviation Authority
°C	-	Degrees Celsius
C. of .A	-	Certificate of Airworthiness
C. of .R	-	Certificate of Registration
CVR	-	Cockpit Voice Recorder
DAAI	-	Directorate of Aircraft Accident and Incident Investigation
FDR	-	Flight Data Recorder
ICAO	-	International Civil Aviation Organization
VFR	-	Visual Flight Rules
UTC	-	Universal Time Coordinated
MPI	-	Mandatory Periodic Inspection
ATC	-	Air Traffic Control
GPS	-	Global Positioning System

*ii*





REPUBLIC OF NAMIBIA

MINISTRY OF WORKS AND TRANSPORT

## Directorate of Aircraft Accident and Incident Investigations

Accident Reference: ACCID/112721/02-05

# Aircraft Accident Investigation Final Report

RELEASE DATE:



# Aircraft Accident Report

---

Belly landing at Eros Airport RWY 19  
Private Flight  
Beech A36, 1972 Aircraft,  
V5-ELZ Eros Airport, Windhoek  
27<sup>th</sup> November, 2021



## Introduction

The information contained in this Accident Report is published to inform the aviation Industry and the public of the general circumstances of the accident that occurred on the 27<sup>th</sup> November 2021.

The purpose of the Directorate of Aircraft Accidents and Incident investigations (DAAII) is to promote aviation safety through the conduct of independent, investigations without prejudice to any judicial or administrative authority consistent with provisions of Namibian Civil Aviation Act, Act 6, of 2016. Which is in-line with ICAO's Annex 13 paragraph 7.1 and 7.2.

The Directorate of Aircraft Accident and Incident Investigations (DAAII) as the authority in charge of the investigations is working in close co - operation with local AMO in conducting further analysis.







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

Aircraft Registration	V5-ELZ	Date of Accident	27 <sup>th</sup> Nov 2021		Time of Accident	06:25 UTC	
Type of Aircraft	1972 BEECH A36 AIRCRAFT		Type of Operation	Private			
Pilot- In - command License Type		PPL PA 73457	Age	22	License Valid	Valid	
Pilot-In-command Flying Experience		Total Flying Hours	110		Hours on Type	100.4	
Last point of departure		Farm Kalakwa S 22° 37' 18.5" E 18° 02' 35.4"					
Next point of intended landing		Eros airport (FYWE)					
Location of the accident site with reference to easily defined geographical points (GPS readings if possible)							
Eros Airport Runway 19, GPS 22° 36' 44"S 17° 04' 49" E							
Meteorological Information		Wind Direction: light and variable°, Wind speed: 0 knots, Visibility: Good, Temperature: 20° C CAVOK					
Number of people on board	1+2	No. of injured people	0		No. of people killed	0	

**Synopsis**

On the 27<sup>th</sup> November 2021, at around 05H45 UTC time a privately owned, Namibian registered aircraft got airborne from Farm Kalakwa for a private flight to Eros Airport. On Board was the pilot and two passengers.

The flight was uneventful for most of the journey. Upon final approach at Eros airport and cleared to land runway 01. The pilot selected undercarriage down position, immediately after the undercarriage down position was selected the aircraft experience a total electrical failure. The pilot tried to revive the electrical system but all effort ended up in vain. The pilot decided to deploy the undercarriage using the manual (emergency) extension System but fail to get the landing gear down and lock. After several teardrops on both runways (runway01 and 19) trying to lower the undercarriage failed. The pilot decided to make an emergency landing. The emergency landing was carried out on runway 19. The aircraft first touchdown on the runway was 40 meters from threshold and it came to a completely stop about 146 meters from the first touchdown point. The pilot shut down the engine and evacuated the aircraft together with the two passengers unharmed.

The pilot could not declare an emergency as it is the procedure in such circumstances because the aircraft had a total electrical failure but the fire and rescue services responded promptly.

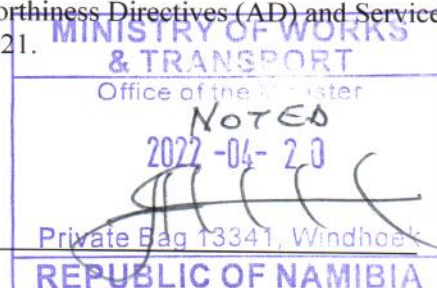
The Directorate of Aircraft Accident and Incident Investigation (DAAII) was informed telephonically about the accident by the controller. The Minister of Works and Transport Ministry was responsible for the release of the official final accident report.

The weather was fine with good visibility.

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

The last Mandatory Periodic Inspection (MPI) was certified on 04 August 2021 at 7061.1 airframe hours. At the time of the accident the aircraft had accumulated a further 80.1 hours since the last MPI was certified.

According to the records, the Aircraft Maintenance Organization (AMO) that certified the last MPI on the aircraft prior to the accident was in possession of a valid AMO Approval (AMO 74). The Regulatory Authority issued the AMO with a temporary approval on the 10 November 2021 with expiry date 12 December 2021. All Airworthiness Directives (AD) and Service Bulletins (SB) were complied with as certified in the last MPI dated 4th August 2021.





**Probable Cause:**

Inadequate operating knowledge of the Manual (emergency) landing gear extension system which resulted in failure to execute the landing gear extension.

**Contributing factor (s):**

Improper battery Maintenance  
Electrical failure





## AIRCRAFT ACCIDENT REPORT

**Name of Owner:** I Dream Africa Tours and Safaris CC  
**Manufacturer:** Beechcraft  
**Nationality:** Namibian V5-ELZ  
**Place:** Eros Airport. GPS 22 36'44" S 17 04'49 E  
**Date:** 27<sup>th</sup> November 2021 Time: 06:25UTC (08:33 local time)

*All times given in this report are in Co-ordinated Universal Time (UTC).*

### Disclaimer:

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

### Purpose of the Investigations:

In terms of Namibia Civil Aviation Act, Act No 6, of 2016 and ICAO Annex 13, this report was compiled in the interest of the promotion of aviation safety and the reduction of risk of aviation accident and incidents and **not to apportion blame or 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 be made available to the investigator (s).

## 1. FACTUAL INFORMATION

### 1.1 History of Flight

- 1.1.1 On the 27th of November 2021, at around 05:45 UTC time a privately owned, Namibian registered aircraft got airborne from Farm Kalakwa for a private flight to Eros Airport. On Board was the pilot and two passengers. There was a flight plan filed.
- 1.1.2 The aircraft was cleared for final approach on runway 01 at Eros Airport by ATC. The weather at the time of the flight was in accordance with visual flight rules (VFR) with clear skies. Upon final for runway 01 the pilot selected the landing gear down position, by operating the landing gear lever located on the forward instrument console.
- 1.1.3 Immediately after the pilot had selected the landing gear to a down position, the aircraft had a total electrical failure which caused the landing gear not to extend to the down position as commanded by the pilot.
- 1.1.4 The pilot then engaged the landing gear manual (emergency) extension system to lower the landing gear manually, but failed. The pilot cranked the landing gear Manual extension system many times while doing teardrops on both runway 01 & 19 but failed to execute the landing gear down extension, because the crank handle was disengaging during the cranking process. This operation can only be successfully executed by a person with operational experience of the system.
- 1.1.5 The aircraft did an emergency landing (wheels up) on runway 19. The aircraft first impact mark on the runway was around 40 meters from the Threshold and it came to a final stop on the runway about 146 meters from the first impact point.



1.1.6 The pilot and the two passengers on board evacuated the aircraft unharmed.

## 1.2 Injuries to Persons

Injuries	Pilot	Crew	Pass.	Other
Fatal	-	-	-	-
Serious	-	-	-	-
Minor	-	-	-	-
None	0	-	0	-



## 1.3 Damage to Aircraft

1.3.1 The aircraft was slightly damage



1.3.2 Figure 1: Photo of the aircraft before the accident. Photo for illustration purpose.



Figure 2: Aircraft slightly damage, mostly on its belly

## 1.4 Other Damage

1.4.1 There was no other damage



## 1.5 Personnel Information

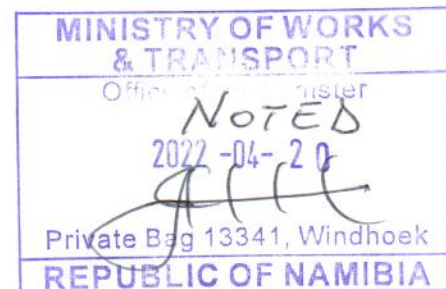
### 1.5.1 Pilot-in-in command

Nationality		Namibian			
Licence No	PA73457	Gender	Male	Age	22
Licence valid		Yes	Type Endorsed	Yes	
Ratings		P1 BeechA36			
Medical Expiry Date		30/ 09/ 2022			
Restrictions		None			
Previous Accidents		Unknown			

Flying Experience:

Total Hours	110
Total Past 90 Days	23.3
Total on Type Past 90 Days	23.3
Total on Type	100.4

\*as at 27/11/2021



## 1.6 Aircraft Information

Airframe:

Type	Beech A36	
Serial No.	E-289	
Manufacture	Beech Aircraft Company	
Year of Manufacture	1972	
Total Airframe Hours (At time of Accident)	7141.2	
Last MPI (Date & Hours)	04 August 2021 airframe hours 7061.1	
Hours since Last MPI	32.3 hours	
C of A (Issue Date)	17 March 2021	
C of R (Issue Date) Present owner	26 July 2019	
Operating Categories	Standard	

Engine:

Type	CMI 10-550-B	
Serial No.	296856-R	
Hours since New	1872.8	
Hours since Overhaul	448.6	

Propeller

Type	Hartzell	
Part no	PHC-C3YF-1RF	
S/N	L08011,L08014,L08022	

## 1.7 Meteorological Information

Wind direction	Light and variable	Wind speed	0kts	Visibility	Good
Temperature	20° C	Cloud cover	Clear	Cloud base	N/A
Dew point	Unknown				

## 1.8 Aids to Navigation

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

## 1.9 Communications.

- 1.9.1 The aircraft was equipped with standard communication equipment as approved by the Regulator for the aircraft type. There was no reported communication problem on 118.70 MHz before the aircraft experienced the electrical failure and after the electrical failure the aircraft could not communicate with the tower any longer.

## 1.10 Aerodrome Information



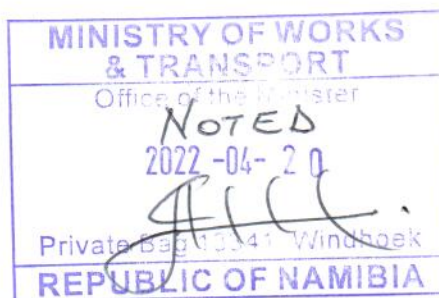
**Figure 3:** Eros Airport GPS co-ordinate position 22°36'44"S 17°04'49"E (runway 19)

## 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.

## 1.12 Wreckage distribution and Impact Information

The aircraft was fully intact until it came to a complete stop on the runway. The aircraft first touchdown on the runway was 40 meters from the threshold and it skid on the runway until it came to a stop 146 meters from the first touchdown point.







**Figure 4:** Depicting where the aircraft came to a completely stop on the runway.



**Figure 4:** Depicting the first aircraft impact point on runway 19.

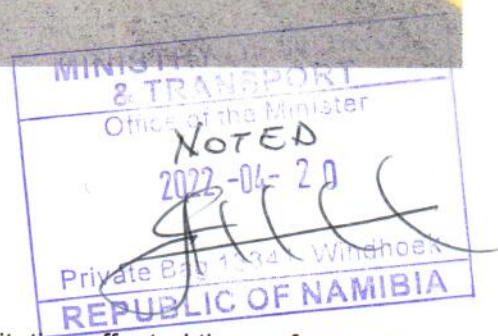
### 1.13 Medical and Pathological Information

#### 1.13.1. The pilot had a valid medical certificate.

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 impact.





## 1.15 Survival Aspects.

- 1.15.1 The impact force was minimum and there was no damage to the cabin. The pilot and the passengers were all secured with safety harnesses and no failure was observed on the safety harnesses.

## 1.16 Tests and Research.

### Landing gear

- 1.16.1. A local AMO was used to carry out the operational checks under the guidance of the DAAI investigator in-charge. The aircraft was placed on jacks and the landing gear was extended manually. The manual (emergency) extension system was engaged and the system was operated towards the full down position. The landing gear transmission mechanism was damaged during the landing and the landing gear could not be locked in the full down position due to damaged mechanism.

The landing gear was secured manually in the full down and locked position so that the aircraft could be moved safely. Although there was damaged caused by the wheels up landing the Manual (emergency) extension system operated as designed.



**Figure 5:** Depicting the landing gear Manual (emergency) extension system.

To operate the System, the pilot need to hold the red handle and turn the handle counter clockwise till you get the three green light on the console, indicating that the landing gear is down and locked. That whole process is what is called cranking.

### Electrical System

- 1.16.2 The electrical system was tested and the battery was found to be drained of all power. The aircraft was powered by the use of external battery source and it was established that the electrical charging system is operating normal. The alternator was removed and tested on the bench it was found to operate normally and delivered the required current. It was then installed back to the aircraft. The voltage regulator was tested and found to operate normal.



## Engine

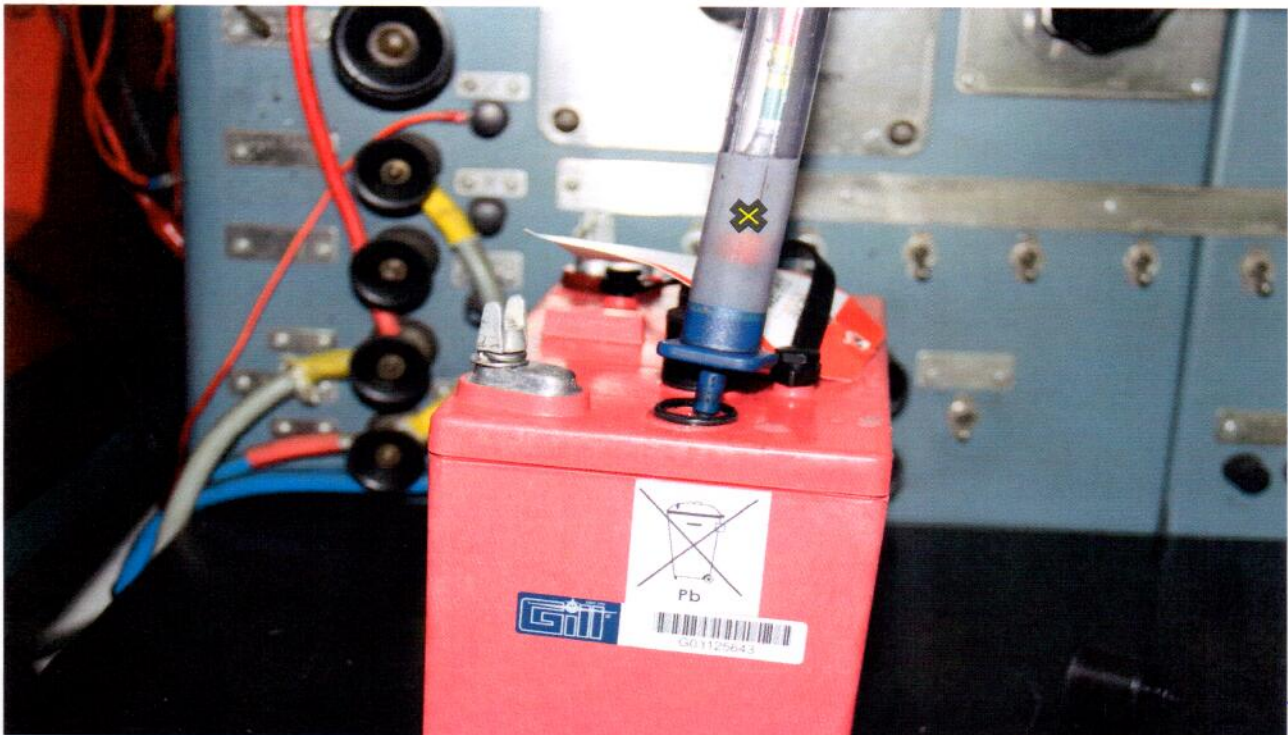
- 1.16.3. The damaged propeller was removed and a serviceable unit was installed, after which the engine was started. The engine was operated at 1500RPM and the alternator delivered and maintained at 13.3 Volts with different loads applied to the engine, which is sufficient to maintain system voltage and keep the battery at an optimal condition

## Battery part number G-35, SERIAL number G03125643

- 1.16.4 The battery was tested according to the Gill Tedelyne Dry charge lead –acid aircraft battery service Manual Q01-1120. During the test it was observed that the fluid in the battery cell was not a clear fluid as normal instead the fluid was dark grey. When the battery was put on the hydrometer the machine was unable to register a reading which is an indication that the Specific Gravity level is higher than the recommended level which should be between 1.275 to 1.295 according to the manual 5.2.4(n). When the sample from the battery was sent for further analysis at the laboratory it was found that the Specific Gravity was 1.46 above the 1.275 to 1.295 that is recommended.

A sample from the container that the AMO used to service the new battery before it was installed in the aircraft was also sent to the laboratory for testing and it was found to have a specific gravity of 1.61 way more than the recommended battery SG.

The battery was declared unserviceable after the finding of the test.

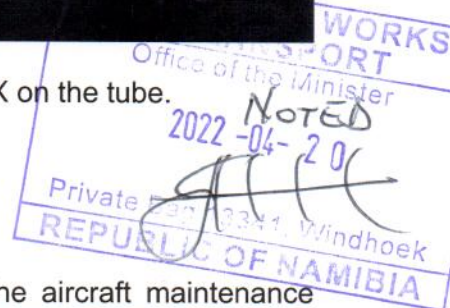


**Figure 6:** Depicting the dark grey contaminated battery fluid mark with an X on the tube.

## **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 aircraft maintenance installed a new battery in the aircraft on the 24/11/2021. The new battery had to be serviced first before it is installed into the aircraft and it is during this service that the battery was serviced with acid which contained a higher Specific gravity than what is recommended in the Manual Q01-1120.





During the new battery conditioning to service the AMO added acid into the battery cells which contained 1.6 level of specific gravity higher than the recommended 1.275 to 1.295.

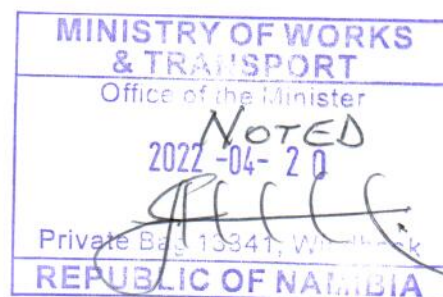
**Note:** After the findings of the conditions of the battery shop were communicated to the AMO, the AMO put corrective measures in place to prevent a reoccurrence. New procedures on battery services were developed in accordance with GILL maintenance procedures.

#### 1.18 Additional Information

1.18.1 None.

#### 1.19 Useful or Effective Investigation Techniques

1.19.1 Not applicable



### 2. ANALYSIS

2. 1. The higher specific Gravity level of 1.6 that was added to the battery during the battery maintenance (conditioning) caused sulphating of the plates which resulted in battery damage and failure.
2. 2. Although the aircraft had an electrical failure a successful landing was still possible if the pilot would have flown to a safe altitude and try to lower the landing gear using the manual (emergency) extension system.
- 2.3 It is the view of the investigator that the teardrops on both runway 01 and 19 during the process of cranking the landing gear to extend and the inadequate operating knowledge of the manual (emergency) landing gear extension system added more load to the pilot which made it difficult for the pilot to execute the landing gear extension manually successfully.
- 2.4 The AMO battery shop does not have adequate battery servicing instruments. This contributed to the incorrect battery service which resulted in the battery damage.

### 3. CONCLUSION

#### 3.1 Findings

- 3.1.1 The maintenance records indicated that the aircraft was certified, equipped and maintained in accordance with existing regulations and approved procedures
- 3.1.2 The aircraft had a certificate of Registration and a valid certificate of Airworthiness.
- 3.1.3 The aircraft battery that was installed on the 24/11/2021 was incorrectly serviced with acid of 1.6 level specific gravity higher than the recommended 1.275 to 1.295.
- 3.1.4 Inadequate knowledge of the manual (emergency) landing gear extension system made it difficult to execute the operation successfully even though it was found during the investigation, that the system was working as designed.
- 3.1.5 The pilot had a valid license, a valid medical certificate and rested adequately to operate the flight.



### 3.2 Probable Cause/s


- 3.2.1. Inadequate operating knowledge of the Manual (emergency) landing gear extension system which resulted in failure to execute the landing gear extension

### 3.3.1 Contributing factor

- 3.3.1 Improper battery maintenance  
3.3.2 Electrical failure


### 4.0 Safety Recommendations

- 4.0.1 None

  
Thomas H. Herman  
Investigator-in-Charge

Date: 20.04.2022

Released by:

  
John Mutorwa, MP

Date: 20.4.2022

MINISTER: MINISTRY OF WORKS AND TRANSPORT

MINISTRY OF WORKS & TRANSPORT
Office of the Minister
2022 -04- 20
Private Bag 13341, Windhoek
REPUBLIC OF NAMIBIA