



AIRCRAFT ACCIDENT REPORT

NPF/2019/08/03/F

Accident Investigation Bureau

Report on the serious incident involving a Bell 429 helicopter with nationality and registration marks 5N-MDA, operated by the Nigeria Police Airwing, which occurred at Nnamdi Azikiwe International Airport, Abuja On 3rd August, 2019



This report was produced by the Accident Investigation Bureau, Nigeria (AIB-N), Nnamdi Azikiwe International Airport, Abuja.

The report was based upon the investigation carried out by AIB-N, in accordance with Annex 13 to the Convention on International Civil Aviation, Civil Aviation Act 2006 and Civil Aviation (Investigation of Air Accidents and Incidents) Regulations 2019. In accordance with Annex 13 to the Convention on International Civil Aviation, it is not the purpose of aircraft accident/serious incident investigations to apportion blame or liability.

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Safety Recommendations in this report are addressed to the Regulatory Authority of the State, as well as other stakeholders, as appropriate. The Regulatory Authority is the authority that ensures implementation and enforcement.

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GLOSSARY OF ABBREVIATION USED IN THIS REPORT

AIB	Accident Investigation Bureau
AMO	Approved Maintenance Organisation
ATC	Air Traffic Control
ATPL	Airline Transport Pilot Licence
CPL	Commercial Pilot Licence
DNAA	Nnamdi Azikiwe International Airport, Abuja
NCAA	Nigerian Civil Aviation Authority
Nig. CARs	Nigeria Civil Aviation Regulations
NiMeT	Nigerian Meteorological Agency
NPAW	Nigeria Police Airwing
PF	Pilot Flying
PM	Pilot Monitoring
SOPs	Standard Operating Procedures
UTC	Coordinated Universal Time
VFR	Visual Flight Rules

Aircraft accident report number:	NPF/2019/08/03/F
Registered owner:	The Nigeria Police
Operator:	Nigeria Police Airwing
Aircraft type and model:	Bell 429
Manufacturer:	Bell Textron, Canada
Year of manufacture:	2012
Nationality and registration marks:	5N-MDA
Serial number:	57084
Location:	Nigeria Police Airwing Ramp, Abuja
Date and Time:	3rd August, 2019 at 18:18 h

All times in this report are local time (equivalent to UTC +1) unless otherwise stated.

SYNOPSIS

The Accident Investigation Bureau (AIB-N) Nigeria, was notified by the Nigerian Police Airwing via a phone call of the occurrence on the 3rd of August 2019. Investigators were dispatched to the site next day.

On 3rd August 2019, a Bell 429 helicopter with nationality and registration marks 5N-MDA operated by the Nigeria Police Airwing (NPAW) was scheduled to drop off VIP at Iyamho in Edo state and return to Nnamdi Azikiwe International Airport, Abuja (DNAA).

According to the flight crew, the flight arrived Iyamho, the passengers disembarked and the flight crew carried out a quick turn around without shutting down the engines.



At 17:15 h, 5N-MDA departed Iyamho on the return flight to DNAA.

The flight crew stated that, while powering down, they heard a very loud sound and the helicopter started vibrating which developed into ground resonance within seconds. The co-pilot activated the emergency engine cut-off valves and applied the rotor brakes. The 5N-MDA drifted to the left towards a parked Bell 412 helicopter (5N-LEH) as the rotors were slowing down. Particles were seen flying in front of the helicopter (5N-MDA). 5N-MDA came to a stop three feet from touchdown point, towards 5N-LEH.

The crew disembarked the helicopter unaided and uninjured.

The investigation identified the following causal and contributory factors:

Causal factor

The lack of communication to update the crew on the current serviceability status of the ground handling wheel prior to arrival at DNAA.

Contributory factor

The decision to hover-taxi to reposition the helicopter to the ramp without guidance.

Two safety recommendations were made.

1.0 FACTUAL INFORMATION

1.1 History of the flight

On 3rd August 2019, a Bell 429 helicopter with nationality and registration marks 5N-MDA operated by the Nigeria Police Airwing (NPAW) was scheduled to drop off VIP at Iyamho in Edo state and return to Nnamdi Azikiwe International Airport, Abuja (DNAA).

Prior to departure from DNAA, the crew observed that the ground handling wheels were not serviceable when the helicopter was to be towed out of the ramp to the take-off position.

At about 16:01 h, the helicopter departed DNAA on a Visual Flight Rules (VFR) flight plan with seven persons on board including the two pilots and three hours fuel endurance.

According to the flight crew, the flight arrived Iyamho, the passengers disembarked and the flight crew carried out a quick turn around without shutting down the engines.

At 17:15 h, 5N-MDA departed Iyamho on the return flight to DNAA. The Pilot was the Pilot Monitoring (PM) while the Co-pilot was the Pilot Flying (PF). The flight crew stated that the take-off, climb, cruise, descent and landing phases of the flight were normal.

At about 18:14 h, 5N-MDA landed on the taxiway opposite the Police Airwing ramp. The flight crew also stated that after landing, the PM took over control and hover-taxed¹ to reposition the helicopter from the taxiway to the Police Airwing ramp to give way to another aircraft that just landed and might need to taxi to the adjoining hanger using

¹ Hover-taxi refers to the hovering movement of a helicopter at altitudes below 10 feet usually; if they must exceed 25 feet a prior clearance must be obtained from the tower. Speeds should not exceed that for a brisk walk.

the same taxiway. Unknown to the crew, the ground handling wheels² had been fixed before their return to DNAA.



Figure 1: Aerial view of incident location. Source: Google maps.

According to the flight crew, while powering down, they heard a very loud sound and the helicopter started vibrating which developed into ground resonance³ within seconds. The co-pilot activated the emergency engine cut-off valves and applied the rotor brakes. The 5N-MDA drifted to the left towards a parked Bell 412 helicopter (5N-LEH) as the rotors were slowing down. Particles were seen flying in front of the helicopter (5N-MDA). 5N-MDA came to a stop three feet from touchdown point, towards 5N-LEH.

² Helicopter ground handling wheels are used to lift a helicopter off the ground for easy movement in the hangar or on the ramp.

³ Ground Resonance is an imbalance in the rotation of a helicopter rotor when the blades become bunched up on one side of their rotational plane and cause an oscillation in phase with the frequency of the rocking of the helicopter on its landing gear.

A tie-down sock ⁴of the parked Bell 412 flew into one of the main rotor blades of 5N-MDA and shattered the blade's trailing edge.

The crew disembarked the helicopter unaided and uninjured.

The incident occurred at 18:18 h in daylight Visual Meteorological Condition.

1.2 Injuries to persons

Injuries	Crew	Passengers	Total in the aircraft
Fatal	Nil	Nil	Nil
Serious	Nil	Nil	Nil
Minor	Nil	Nil	Nil
None	2	Nil	2
TOTAL	2	Nil	2

1.3 Damage to aircraft

The helicopter was substantially damaged.

1.4 Other damage

A tie-down sock of the parked Bell 412 (5N-LEH) was severed.

⁴ A tie-down sock are kit that are designed specifically to secure the blade tips and tie the main landing gear of a helicopter.

1.5 Personnel information

1.5.1 Pilot

Nationality:	Nigerian
Age:	61 years
License type:	Airline Transport Pilot Licence (H)
Licence validity:	Valid till 8th August, 2019
Aircraft ratings:	Bell 412, 407, 427, 429, 206, 430, Eurocopter AS350, AS350-B2, AS355, AgustaWestland AW109
Instrument rating:	Valid till 12th November, 2019
Proficiency check:	Valid till 14th November, 2018
Medical:	Valid till 8th August, 2019
Total flying hours:	9550 h
On type:	350 h
Last 90 days:	120 h
Last 28 days:	18 h
Last 24 hours:	4 h

1.5.2 Co-pilot

Nationality:	Nigerian
Age:	26 years
Licence type:	Commercial Pilot Licence (H)

Licence validity:	Valid till 28th August, 2023
Aircraft rating:	Robinson R66, Bell 429
Instrument rating:	Valid till 1st May, 2020
Proficiency check:	Valid till 2nd May, 2019
Medical:	Valid till 11th February 2020
Total flying hours:	161 h
On type:	28 h
Last 90 days:	25 h
Last 28 days:	13:20 h
Last 24 hours:	2 h

1.6 Aircraft information

1.6.1 General information

Aircraft type:	Bell 429
Serial number:	57084
Registration number:	5N-MDA
Operator:	Nigeria Police Airwing
Manufacturer:	Bell Textron, Canada
Year of manufacture:	2012
Total airframe time:	587.7 h
Certificate of insurance:	Valid till 14th September, 2019
Certificate of airworthiness:	Valid till 20th September, 2019

Category: Transport (Passenger)

Certificate of registration: Issued 26th February, 2013

The helicopter had been moved from the site of the occurrence into the hangar and the damaged main rotor blade disassembled before the arrival of investigators.



Figure 2: Picture of the 5N-MDA

1.6.2 Powerplant

Engine	Number 1	Number 2
Manufacturer	Pratt & Whitney Canada	Pratt & Whitney Canada
Type	PW207D1	PW207D1
Serial number	PCEBLO173	PCEBLO172
Time Since New (TSN)	680:30 h	681:45 h
Cycles Since New (CSN)	644	645

1.6.3 Maintenance of 5N-MDA

According to the records available to the Bureau, the aircraft had been maintained in accordance with the Bell 429 Maintenance Planning Information (PMC-429-97499-01000-00) Issue No. 002, 2019-12-03. There was no open Deferred Defect.

1.7 Meteorological information

Not Applicable.

1.8 Aids to navigation

Not Applicable.

1.9 Communications

There was two-way communication between the crew and Air Traffic Control (ATC).

1.10 Aerodrome information

Not Applicable.

1.11 Flight recorders

The helicopter was not fitted with flight data and cockpit voice recorders; neither was it required by the Nigeria Civil Aviation Regulations (Nig. CARs).

1.12 Wreckage and impact information

The helicopter was intact with one of its main rotor blades shattered.



Figure 3: Damaged Main Rotor Blade



Figure 4: The severed tie-down sock from the parked Bell 412 (5N-LEH)

1.13 Medical and pathological information

Toxicological and alcohol tests were not carried out on the crew.

1.14 Fire

There was no pre or post-impact fire.

1.15 Survival aspect

The occurrence was survivable as there was livable volume of space for occupants and the aircraft fuselage remained intact. The seats, seat belt harness and attachment were all intact.

1.16 Tests and research

Not Applicable.

1.17 Organizational and management information

1.17.1 The Nigerian Police Airwing (NPAW)

The Nigeria Police Airwing (NPAW) is a unit under the Nigeria Police Force Operations Department, which provides flight services, including search and rescue operations, Police air ambulance services, aerial patrol operations, VIP transport operations, lifting of electoral personnel/material and other equipment.

The NPAW has a fleet of 14 aircraft including 13 Bell helicopters (1 B429, 3 B463, 3 B427 and 6 B412) and 1 Cessna Citation (560 XLS+) aircraft.

NPAW is an NCAA Approved Maintenance Organisation (AMO) with the AMO Number AMO/5N/NPF valid till 26th May 2020 and 5N-MDA (Bell 429) was not included in their AMO operations specifications (OPSECS). See Appendix 1: Nigerian Police Airwing Operation Specification. Permit for Non-Commercial Flight was granted to NP on 19th November, 2010 by NCAA and was valid for three years from date of issuance.

NPAW does not have approved Standard Operating Procedures (SOPs).

1.17.2 Nigeria Police Airwing aircraft towing and parking procedures

The NPAW does not have written procedures for towing and parking of helicopters, but they stated that the usual practice is for the pilots to land the helicopter on the taxiway and the engineers tow the helicopter to either the hanger or the ramp. The NPAW does not have a designated landing area for helicopters.

1.18 Additional information

1.18.1 Excerpts from Civil Aviation (Investigation of Air Accidents and Incidents) Regulations 2019

19.— (1) Where an accident or a serious incident occurs in Nigeria, the Bureau shall take all reasonable measures to protect the evidence and to maintain safe custody of the aircraft and its contents for such a period as maybe necessary for the purposes of an investigation. Protection of evidence shall include the preservation, by photographic or other means of any evidence which might be removed, effaced, lost or destroyed. Safe custody shall include protection against further damage, access by unauthorized persons, pilfering and deterioration.

2.—(a) No person other than the Commissioner, the investigator-in-charge or an authorized person shall have access to the aircraft involved in the accident or serious incident, the contents thereof, or the site of the accident or serious incident; and

(b) No person shall move or interfere with the aircraft, its contents or the site of the accident or serious incident except under the authority of the commissioner or the investigator-in-charge.

3. Notwithstanding Sub-paragraph 19.1 above:



(a) The aircraft involved in an accident or serious incident may be removed or interfered with to such extent as may be necessary for all or any of the following purposes:

(i) extricating persons or animals;

(ii) removing any mail, valuables or dangerous goods carried by the aircraft for the purpose of preservation;

(iii) preventing destruction by fire or other cause;

(iv) preventing any danger or obstruction to the public, air navigation or other transport; or

(b) if an aircraft is wrecked in water, the aircraft or any contents thereof may be removed to such extent as may be necessary for bringing the aircraft or its contents to a place of safety.

2.0 ANALYSIS

2.1 General

The flight crew were certified, qualified and adequately rested to conduct the flight.

Permit for Non-Commercial Flight (PNCF) was granted to NP on 19th November, 2010 by NCAA, valid for three years from date of issuance. It has not been renewed since then.

The helicopter had a valid certificate of airworthiness and was maintained in accordance with approved maintenance programme.

NPAW is an Approved Maintenance Organisation (AMO) with the AMO Number AMO/5N/NPF valid till 13th October 2018.

There was no reported adverse weather during the flight.

The analysis will focus on conduct of the flight and removal of wreckage before the arrival of AIB investigators.

2.2 Conduct of the Flight

The take-off, climb, cruise, approach and landing were normal. The usual practice by the NPAW after landing on the taxiway, is to shut down the engines and the helicopter will then be towed to the hangar or the ramp using ground handling wheels. However, after landing on the taxiway, the Pilot decided to reposition the helicopter to the ramp by hover-taxi to allow for taxiway usage. The pilot hover-taxiied the helicopter to the ramp, having in mind that the ground handling wheel was unserviceable at the time of departure and not been advised that the equipment had been fixed while they were away.

NPAW does not have a designated landing site for helicopters, had there been one, there would be no need to land on the taxiway and hover-taxi to the ramp after landing. Also, a helicopter landing area would provide a safer means of take-off and landing which would prevent the urgent need to reposition the helicopter. Moreover, the landing site can be designed according to the exact need and desire of the user.

Had the crew been advised about the current status of the equipment prior to arrival, they probably would have landed the helicopter and shut down on the taxiway without the need for a hover-taxi.

The crew adjudged the clearance between 5N-MDA and the parked 5N-LEH to be enough for safe parking without any means of guidance. However, while powering down, the downwash⁵ generated by the main rotor blades of 5N-MDA blew off a tie-down sock of the parked 5N-LEH. As a result, the tie-down sock flew into one of the main rotor blades of 5N-MDA and shattered its trailing edge.

2.3 Removal of wreckage before the arrival of AIB investigators

Civil Aviation Act 2006 mandates Accident Investigation Bureau to investigate any serious incident or accident that occurs in Nigeria airspace or elsewhere where Nigeria interest is involved. AIB is also expected to determine the cause and circumstances surrounding the occurrence. Civil Aviation (Investigation of Air Accidents and Incidents) Regulations 3 section 19 subsection 2 paragraphs (a) and (b) respectively, requires that: *no person other than the Commissioner, the investigator-in-charge or an authorized person shall have access to an aircraft involved in accident or serious incident, the contents thereof, or the site of the accident or serious incident; and no*

⁵ Downwash is the change in direction of air deflected by the aerodynamic action of an airfoil, wing or helicopter rotor blade in motion, as part of the process of producing lift. The force required to create the downwash is equal in magnitude and opposite in direction to the lift force on the airfoil.



person shall move or interfere with the aircraft, its contents or the site of the accident or serious incident except under the authority of the commissioner or the investigator-in-charge.

In this case, upon arrival of the AIB team the following day, it was discovered that the incident helicopter was moved into the hangar using the ground handling wheels and the damaged blade was removed.

3.0 CONCLUSIONS

3.1 Findings

1. The crew were certified and qualified to conduct the flight.
2. The flight crew proficiency check was invalid at the time of the occurrence.
3. 5N-MDA had a valid certificate of airworthiness at the time of the occurrence.
4. NPAW does not have approved Standard Operating Procedures (SOPs).
5. Bell 429 was not included in NPAW AMO operations specifications (OPSECS).
6. NPAW does not have a designated landing site/helipad for helicopters.
7. Permit for Non-Commercial Flight (PNCF) was not valid at the time of the occurrence.
8. The take-off, climb, cruise, approach and landing were normal.
9. 5N-MDA landed on the taxiway and hover-taxed to the ramp for parking.
10. The ground handling wheel was unserviceable at time of departure from DNAA.
11. At the time of arriving DNAA, the crew were not aware that the ground handling wheel had been fixed while they were away.
12. There were other aircraft parked on the Police Airwing ramp, including the Bell 412 helicopter (5N-LEH).
13. The downwash generated by the main rotor blades of 5N-MDA blew off a tie-down sock of the parked 5N-LEH.
14. The tie-down sock flew into one of the main rotor blades of 5N-MDA and shattered its trailing edge.
15. The incident helicopter was moved into the hangar using the ground handling wheels.
16. The damaged main rotor blade was removed before the arrival of AIB safety investigators.

3.2 Causal factor

The lack of communication to update the crew on the current serviceability status of the ground handling wheel prior to arrival at DNAA.

3.3 Contributory factor

The decision to hover-taxi to reposition the helicopter to the ramp without guidance.

4.0 SAFETY RECOMMENDATIONS

4.1 Safety recommendation 2021-022


Nigeria Police Airwing should develop a proper communication procedure for departing and arriving aircraft for information dissemination where necessary.

4.2 Safety recommendation 2021-023

Nigeria Police Airwing should adhere to all relevant provisions of Nig. CARs.

APPENDICES

Appendix 1: Nigerian Police Airwing Operation Specification

 <p style="text-align: center;">NIGERIAN CIVIL AVIATION AUTHORITY AVIATION HOUSE P. M. B. 21029, 21038, Ikeja, Lagos, Nigeria</p>				
AMO OPERATIONS SPECIFICATIONS (OPSPECS)				
NAME OF ORGANISATION: THE NIGERIA POLICE AIRWING				
Certificate No. AMO/5N/NPF			Expiry Date: 26TH MAY, 2020	
The Certificate Holder is approved in the following Ratings and Limitations				
1. RATINGS AND LIMITATIONS (AMO Part 6.2.1.12)				
Rating		Limitation		
None Authorized				
2. LIMITED RATINGS (AMO Part 6.2.1.13)				
<u>Ratings</u>	<u>Manufacturer</u>	<u>Make/Model</u>	<u>Capability</u>	<u>Limitation</u>
AIRFRAME	BELL HELICOPTER	BELL 412 EP		Line and base maintenance inspection up to and including 600Hr/12 months in accordance with Operator's Approved Maintenance Programme and Maintenance Manual.
ACCESSORIES	FROM THE APPROVED NPAW CAPABILITY LIST	From The Approved NPAW Capability List		Limited to those Accessories listed in the Approved Nigeria Police Airwing Capability List as Amended.
3. SPECIALISED SERVICE (RATINGS (AMO Part 6.2.1.13c)				
Rating		Specifications		Limitations
None Authorized				
LOCATIONS: NNAMDI AZIKIWE INTERNATIONAL AIRPORT, ABUJA FCT.				