AIRCRAFT ACCIDENT REPORT

AIRPEACE/2019/05/15/F

Accident Investigation Bureau

Report on the Serious Incident involving Boeing 737-300 aircraft owned and operated by Air Peace Limited with nationality and registration marks 5N-BUK which occurred at Murtala Muhammed Airport, Lagos On 15th May, 2019

This report is produced by the Accident Investigation Bureau (AIB), Nnamdi Azikiwe International Airport, Abuja.

The report is based upon the investigation carried out by Accident Investigation Bureau, in accordance with Annex 13 to the Convention on International Civil Aviation, Nigerian 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.

Readers are advised that Accident Investigation Bureau investigates for the sole purpose of enhancing aviation safety. Consequently, AIB reports are confined to matters of safety significance and should not be used for any other purpose.

Accident Investigation Bureau believes that safety information is of great value if it is passed on for the use of others. Hence, readers are encouraged to copy or reprint for further distribution, acknowledging the Accident Investigation Bureau as the source.

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

Printed in Nigeria for the Accident Investigation Bureau (AIB)

TABLE OF CONTENTS

TABLE OF FIGURES

GLOSSARY OF ABBREVIATIONS USED IN THIS REPORT

AGL	Above Ground Level
AMM	Aircraft Maintenance Manual
AMSL	Above Mean Sea Level
ATC	Air Traffic Control
ATPL	Aeroplane Transport Pilot Licence
CVR	Cockpit Voice Recorder
CRM	Crew Resource Management
DME	Distance Measuring Equipment
DNMM	ICAO designator for Murtala Muhammed Airport
DNPO	ICAO designator for Port Harcourt Airport
FDR	Flight Data Recorder
fpm	feet per minute
IFR	Instrument Flight Rules
ILS	Instrument Landing System
IMC	Instrument Meteorological Conditions
NM	Nautical Miles
PIREP	Pilot Report
PF	Pilot Flying
PM	Pilot Monitoring
TWR	Control Tower

VMC Visual Meteorological Conditions

VOR Very High Frequency Omnidirectional Radio Range

Aircraft accident report number:	AIRPEACE/2019/05/15/F
Registered owner and operator:	Air Peace Limited
Aircraft type and model:	Boeing 737-300
Manufacturer:	The Boeing Company, USA
Date of manufacture:	1997
Serial number:	28561
Nationality and registration marks:	5N-BUK
Location:	Runway 18R, Murtala Muhammed Airport, Lagos
Date and time:	15th May, 2019 at about 19:34 h *All times in this report are local time (UTC +1) unless otherwise stated*

SYNOPSIS

Accident Investigation Bureau, Nigeria (AIB-N) became aware of this occurrence after a telephone call from a passenger on-board the incident flight on the 5th of June 2019, three weeks after the occurrence.

AIB-N contacted the operator and subsequently, investigators were dispatched to the corporate office of Air Peace Limited on the 6th of June 2019, to make further enquiries.

AIB-N post-incident inspection of the aircraft and subsequent evaluation revealed evidence of significant damage to the aircraft structure and its No. 2 engine. The aircraft had been declared unserviceable and grounded by the operator since the date of the incident for further maintenance evaluation.

On 15th May, 2019 at about 18:43 h, a Boeing 737-300 aircraft with nationality and registration marks 5N-BUK, owned and operated by Air Peace Limited departed Port Harcourt International Airport (DNPO) for Murtala Muhammed Airport (DNMM), Lagos; as a scheduled flight APK7091, operating on an Instrument Flight Rules (IFR) flight plan.

The flight departed DNPO with 123 persons on board inclusive of 6 crew members (2 flight crew and 4 cabin crew). The Captain was the Pilot Flying (PF) while the Co-pilot was Pilot Monitoring (PM).

At 19:24 h, the aircraft was on final approach to Runway 18R. The crew established communication with the Lagos Tower (TWR) requesting information about the runway condition. Lagos TWR reported that the approach path was clear but there was thunderstorm on the take-off path Runway 18R, and subsequently, issued a windshear alert.

The crew continued the approach and the aircraft encountered high crosswinds.

At 19:34 h, the aircraft touched down with a right bank in rain, impacting the runway with the right (No. 2) engine cowling. The crew informed Lagos TWR of their intention to stop on the runway due low visibility and reported exiting the runway at 19:40 h.

APK7091 taxied to the apron and the passengers disembarked normally at about 20:00 h. The inspection of the aircraft after landing revealed that it was substantially damaged.

The incident occurred at night.

The investigation identified the following:

Causal factor

Inadequate recovery inputs from high rate of descent.

Contributory factor

1. High rate of descent occasioned by sudden wind change at short finals.
2. Inadequate crew resource management in the cockpit.

One Safety Recommendation was made.

1.0 FACTUAL INFORMATION

1.1 History of the flight

On 15th May, 2019 at about 18:43 h, a Boeing 737-300 aircraft with nationality and registration marks 5N-BUK, owned and operated by Air Peace Limited departed Port Harcourt Airport (DNPO) for Murtala Muhammed Airport (DNMM), Lagos as a scheduled passenger flight APK7091, operating on an Instrument Flight Rules (IFR) flight plan. The flight was dispatched with a fuel endurance of about 2 hours 35 minutes. There were 123 persons on board inclusive of 6 crew members (2 cockpit crew and 4 cabin crew). The Captain was the Pilot Flying (PF) while the First officer was the Pilot Monitoring (PM).

At 19:24 h, the aircraft was on final approach to Runway 18R. The crew called DNMM Tower (TWR) requesting information about the runway condition. TWR reported that the approach path was clear but there was thunderstorm on the take-off path Runway 18R.

At 19:32 h, the crew called DNMM TWR and reported 2 NM to touchdown. DNMM TWR acknowledged and transmitted weather condition indicating wind 210°/11 knots, and also issued a wind shear alert of 60 knots on the approach path of Runway 18R.

APK7091 was sequenced to number three on approach. The crew stated that the two preceding traffic landed successfully and there were no Pilot Reports (PIREPs) from the crew of either aircraft.

The crew reported that at about 1 NM to touchdown, the Flight Management Computer (FMC) indicated a wind factor of 144°/34 knots. PF stated, "I applied the required crosswind technique to keep the airplane flying towards the runway".

The PM called for a go-around and the PF said he had control of the situation. Information obtained from the FDR shows that at about 300 ft Above Ground Level (AGL) the autopilot was disengaged.

The PM reportedly called again, for a go-around. The PF responded that he was in control.

The aircraft touched down at 19:34 h in rain. The PF reported in his statement, "landing was positive and the landing roll was executed with aileron into the winds and directional control maintained with the rudders." The crew later informed TWR of intention to stop on the runway due low visibility and reported exiting the runway at 19:40 h.

APK7091 taxied to the apron and the passengers disembarked normally without injury at about 20:00 h. Post-flight inspection carried out by the crew and engineers after landing revealed that the aircraft was substantially damaged.

The incident occurred at night in Instrument Meteorological Conditions (IMC).

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	6	117	123
Total	6	117	123

1.3 Damage to aircraft

The aircraft was substantially damaged.

1.4 Other damage

Nil.

1.5 Personnel information

1.5.1 Captain (Pilot Flying)

Nationality:	Nigerian
Age:	29 years
Licence type:	Airline Transport Pilot License (Aeroplane)
Licence:	Valid till 24th June, 2019
Aircraft ratings:	B737-300/500, B737-NG
Medical certificate:	Valid till 2nd December, 2019
Simulator:	Valid till 13th June, 2019
Instrument rating:	Valid till 13th December, 2019
Proficiency check:	1st June, 2019
Total flying time:	6,250 h
Total on type:	5,950 h
Total on type (PIC):	1,650 h
Last 90 days:	232 h
Last 7 days:	18 h
Last 24 hours:	Nil

1.5.2 First Officer (Pilot Monitoring)

Nationality:	Nigerian
Age:	33 years
Licence type:	Airline Transport Pilot License (Aeroplane)
Licence:	Valid till 9th June, 2020
Aircraft ratings:	B737-300/500, B737-NG
Medical certificate:	Valid till 9th June, 2020
Simulator:	Valid till 1st December, 2019

Instrument rating:	Valid till 1st June, 2020
Proficiency check:	10th June, 2019
Total flying time:	3,423.23 h
Total on type:	3,262.34 h
Last 90 days:	184.15 h
Last 7 days:	26.35 h
Last 24 hours:	05.10 h

1.6 Aircraft information

Type:	Boeing 737-300
Manufacturer:	The Boeing Company, USA
Year of manufacture:	1997
Serial number:	28561
Certificate of airworthiness:	Valid till 26th June, 2019
Certificate of insurance:	Valid till 8th October, 2019
Certificate of registration:	10th July, 2017
Noise certificate:	12th July, 2017
Airframe time:	49,738:05 h
Cycles since new (CSN):	36,885

1.6.1 Powerplant

	Engine No. 1	**Engine No. 2**
Model	CFM56-3C-1	CFM56-3B-1
Serial number	857307	856377
Time since new	75,025.22 h	43,560.14 h
Cycle since new	65,224 h	36,494 h
Year of manufacture	1992	1992

Fuel Type Used: Jet A-1

1.7 Meteorological information

LOCATION	**DNMM**		
Time	**1800Z**	**1900Z**	**2000Z**
Wind	230°/11 kt	110°/10G22 kt	180°/5kt
Visibility	10 km	7 km	7 km
Weather	Nil	Thunderstorm in light rain	Thunderstorm in light rain
Cloud	FEW 390 m FEW 600 m CB	BKN 210 m FEW 510 m CB	BKN 210 m FEW 510 m CB
Temperature /Dew Point	29 °C/26°C	23 °C/23°C	23 °C/23°C
QNH	1012 hPa	1014 hPa	1013 hPa
TREND	NOSIG	NOSIG	NOSIG

1.8 Aids to navigation

The Instrument Landing System (ILS) was available and serviceable at the time of the incident. The VOR/DME was also serviceable.

1.9 Communications

There was effective communication between the crew and Air Traffic Control.

1.10 Aerodrome information

Murtala Muhammed Airport with location indicator DNMM has four runways with designations 18R/36L and 18L/36R.

Runway 18R/36L has a dimension of 3,900 m by 60 m. Aerodrome Reference Point is 06°33'09" N 003°18'48" E and an elevation of 135 ft Above Mean Sea Level (AMSL).

1.11 Flight recorders

The aircraft was fitted with Solid-State Flight Data and Cockpit Voice Recorders.

	Flight Data Recorder	**Cockpit Voice Recorder**
Manufacturer	Allied Signal, USA	Honeywell International Inc. USA
Part Number	980-4700-033	980-6022-001
Serial Number	SSFDR-0728	CVR120-15593

The Flight Data Recorder was downloaded and analysed at the Accident Investigation Bureau's Flight Safety Laboratory in Abuja.

The Cockpit Voice Recorder (CVR) was also downloaded at the Accident Investigation Bureau's Flight Safety Laboratory in Abuja. The relevant recordings of the occurrence were found to have been overwritten.

1.11.1 FDR plots

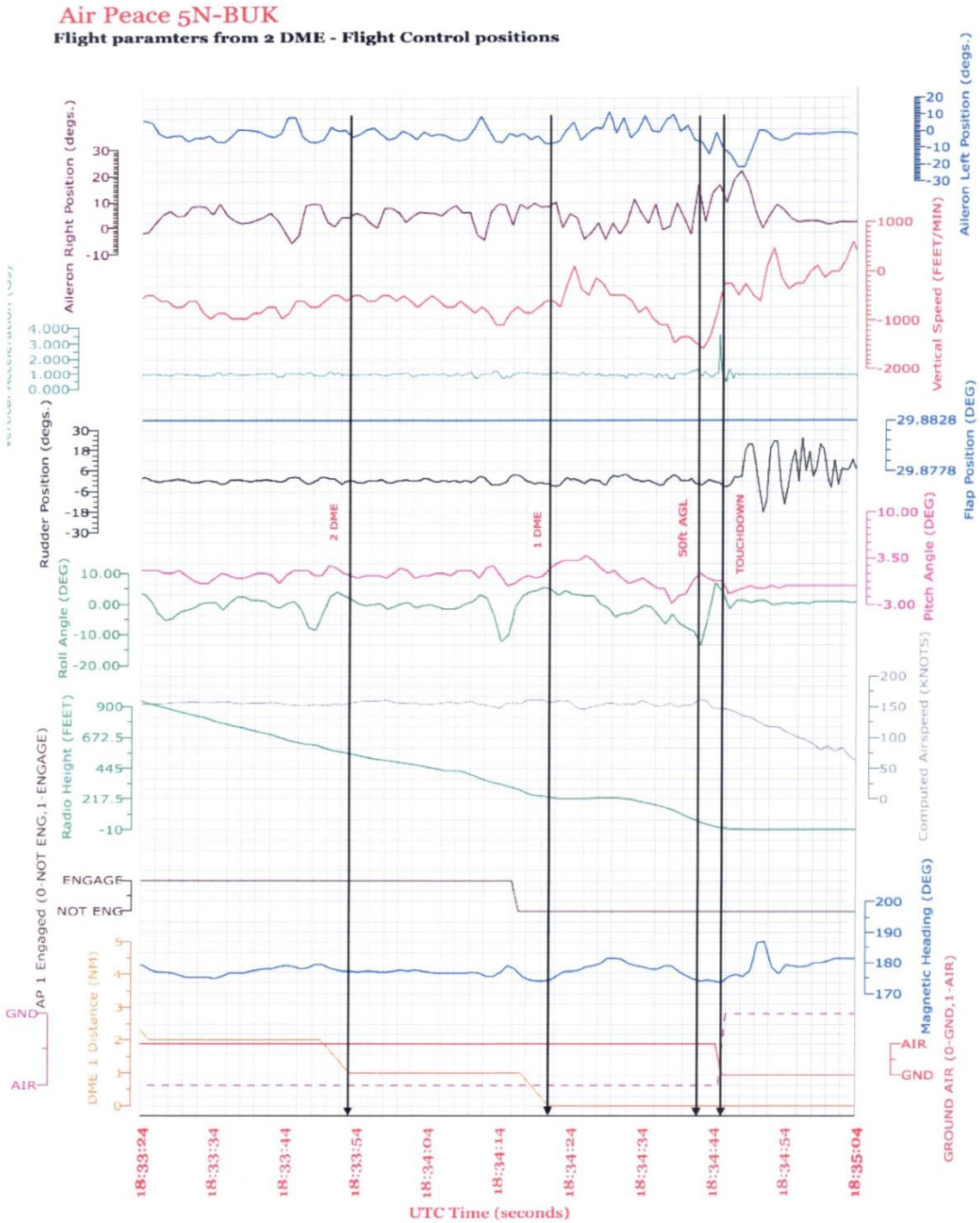

Figure 1: Flight control parameters from 2 NM

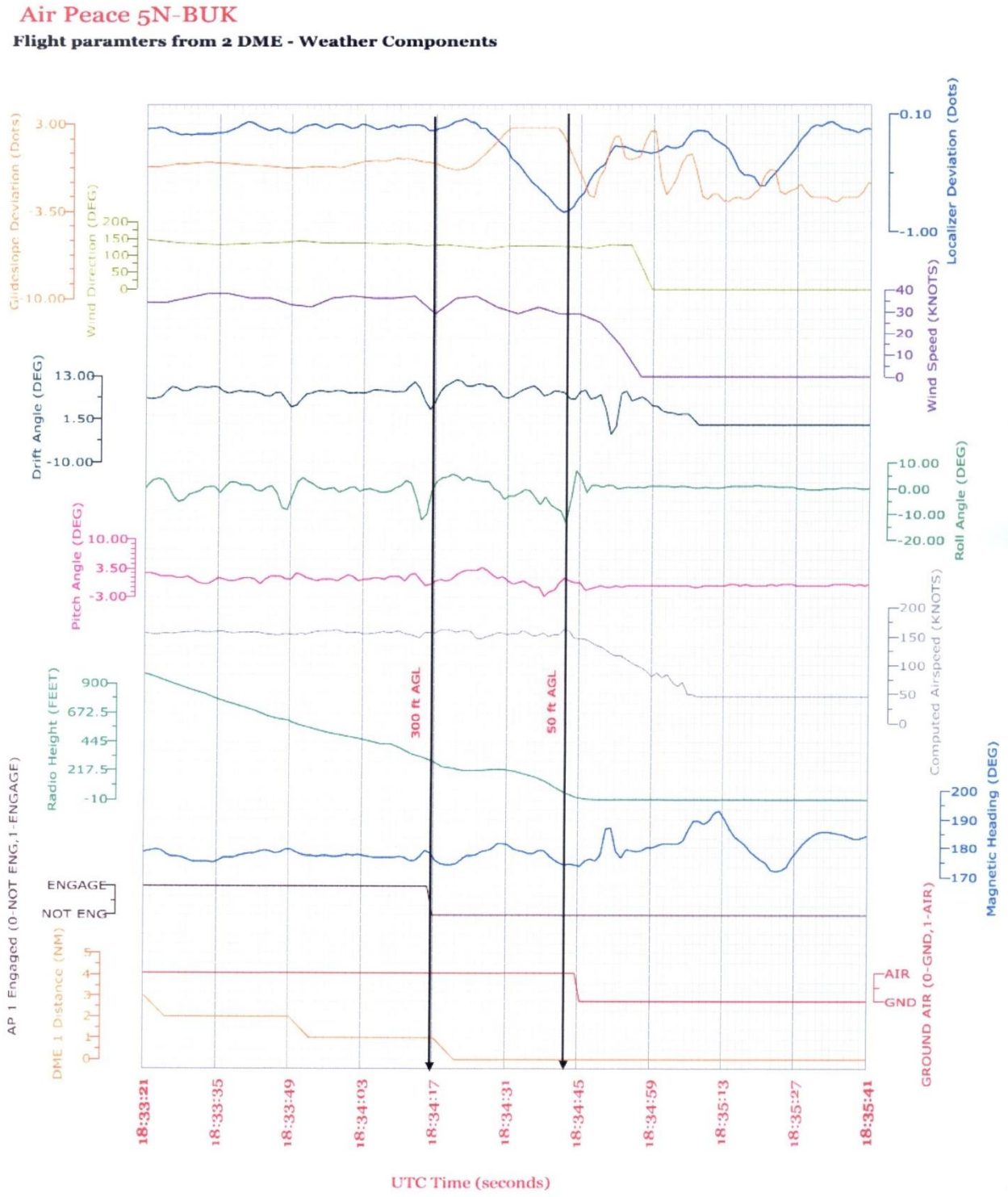

Figure 2: Weather related parameters from 2 NM

1.12 Wreckage and impact information

The aircraft touched down in a right bank, impacting the runway with the right (No. 2) engine cowling. The following damage were observed:

1. Abrasions and dents on the No. 2 engine cowling.
2. Abrasions and dents on the No. 2 thrust reverser cowling.
3. Some fan blades were bent on No. 2 engine.
4. Both main landing gear oleo struts bottomed.
5. Scuffing of the sidewall of the No. 4 main wheel tyre.

Figure 3: Photo of scuff marks on the No. 4 main wheel tyre

Figure 4: Photo of the displacement of the right main landing gear door clamps and oleo struts

Figure 5: Photo and close up of the left main landing gear oleo strut

Figure 6: Photo of abrasions and dents on the No. 2 engine cowling

Figure 7: Close-up photo of the abraded surface of the No. 2 engine cowling

Figure 8: Close-up photo of Engine No. 2 fan blades

Figure 9: Photo of the aircraft where it was parked at the time of post occurrence inspection

1.13 Medical and pathological information

Not available.

1.14 Fire

There was no fire.

1.15 Survival aspects

Not Applicable.

1.16 Test and research

Not Applicable.

1.17 Organizational and management information

1.17.1 Air Peace Limited

Air Peace is a private Nigeria airline founded in 2013 with its head office in Lagos State, Nigeria. Its operating Base is Murtala Muhammed Airport. Air Peace, which provides passenger and charter services, serves the major cities of Nigeria and flies to several destinations including West Africa and the Middle East. The airline also established a subsidiary- Air Peace Hopper in 2018. Air Peace designations are; P4 (IATA), APK (ICAO) and PEACEBIRD (Call sign).

1.17.1.1 Excerpts from Air Peace Operations Manual Part A – Operating Procedures

8.3.8.3.3 Avoiding Thunderstorms

8.3.8.3.3.1 General Ride

AIR PEACE LIMITED flight crew shall not treat thunderstorm lightly. Avoiding thunderstorms is the best policy.

a) *AIR PEACE LIMITED flight crew shall not land or take-off into an approaching thunderstorm. Turbulence wind reversal or windshear can cause loss of control.*
b) *AIR PEACE LIMITED flight crew shall not attempt to fly under a thunderstorm even if they can see through to the other side of the thunderstorm. Turbulence and windshear under the storm can be disastrous.*

c) *AIR PEACE LIMITED flight crew shall not depart without an airborne radar into a cloud mass containing scattered embedded thunderstorms. Scattered thunderstorms not embedded usually can be visually circumnavigated during day light hours.*
d) *The flight crew shall not take and trust the visual appearance to be a reliable indicator of the turbulence inside a thunderstorm.*
e) *The flight crew will avoid by at least 20 NM any thunderstorm identified as severe or giving an intense radar echo. This is especially true under the anvil of large cumulonimbus.*
f) *AIR PEACE LIMITED flight crew shall not circumnavigate the entire area if the area has 6/10 thunderstorm coverage.*
g) *Flight crew shall consider that vivid and frequent lightning indicates the probability of a severe thunderstorm.*
h) *Flight crew will consider as extremely hazardous any thunderstorm with tops of 35,000 feet or higher, whether the top is visually sighted or determined by radar.*

8.3.8.3.3.2 Departure and Arrival

When a significant thunderstorm activity is approaching within 15 NM of the station, the Commander shall consider concluding the departure or arrival from a different direction or delaying take-off or landing.

The Commander shall use all available information including PIREPs, ground radar, aircraft radar, reported-lower winds, and visual observations towards making this judgement. Within the terminal area, thunderstorms will be avoided by no less than 3 NM. Most radar are specifically designed to reduce or exclude returns from "weather" and in this regard little or no assistance can be given by the ATC.

Nevertheless, any guidance given by the ATC shall be used in conjunction with the aircraft weather radar, to guard against possible inaccuracies in the ground radar's interpretation of the relative severity of the different parts of a storm area. Any discrepancies in this regard will be reported to the ATC.

OPERATIONS MANUAL PART B – NORMAL PROCEDURES

3.23A STABILIZED APPROACH RECOMMENDATIONS

Maintaining a stable speed, descent rate, and vertical/lateral flight path in landing configuration is commonly referred to as the stabilized approach concept.

Any significant deviation from planned flight path, airspeed, or descent rate should be announced. The decision to execute a go-around is no indication of poor performance.

Note: Do not attempt to land from an unstable approach.

Recommended Elements of a Stabilized Approach

The following recommendations are consistent with criteria developed by the Flight Safety Foundation.

All approaches should be stabilized by 1,000 feet above airport elevation in instrument meteorological conditions (IMC) and by 500 feet above airport elevation in visual meteorological conditions (VMC). An approach is considered stabilized when all of the following criteria are met:

- *the airplane is on the correct flight path*
- *only small changes in heading/pitch are required to maintain the correct flight path*
- *the airplane speed is not more than V_{REF} + 20 knots indicated airspeed and not less than V_{REF}*

- *the airplane is in the correct landing configuration*
- *sink rate is no greater than 1,000 fpm; if an approach requires a sink rate greater than 1,000 fpm, a special briefing should be conducted*
- *power setting is appropriate for the airplane configuration*
- *all briefings and checklists have been conducted.*

Specific types of approaches are stabilized if they also fulfil the following:

- *ILS approaches should be flown within one dot of the glide slope and localizer, or within the expanded localizer scale (as installed)*
- *during a circling approach, wings should be level on final when the airplane reaches 300 feet above airport elevation.*

Unique approach procedures or abnormal conditions requiring a deviation from the above elements of a stabilized approach require a special briefing.

Note: An approach that becomes unstabilized below 1,000 feet above airport elevation in IMC or below 500 feet above airport elevation in VMC requires an immediate go-around.

These conditions should be maintained throughout the rest of the approach for it to be considered a stabilized approach. If the above criteria cannot be established and maintained at and below 500 feet AGL initiate a go-around.

1.18 Additional information

1.18.1 Hard landing

A hard landing occurs when an aircraft hits the ground with a greater vertical speed and force than in a normal landing.

Landing is the final phase of flight, in which the aircraft returns to the ground. The average vertical speed in a landing is around 2 metres per second (6.6 ft/s or 396 fpm); greater vertical speed should be classed by crew as hard.

Hard landings can be caused by weather conditions, mechanical problems, over-weight aircraft, pilot decision and/or pilot error. The term hard landing usually implies that the pilot still has total or partial control over the aircraft, as opposed to an uncontrolled flight into terrain (a crash). Hard landings can vary in their consequences, from mild passenger discomfort to aircraft damage, structural failure, injuries, and/or loss of life. When an aircraft has a hard landing, it must be inspected for damage before its next flight.

1.18.2 Excerpts from Boeing 737-300/400/500 Aircraft Maintenance Manual, Section 05-51-51

HARD LANDING OR HIGH DRAG/SIDE LOAD LANDING, OR OFF RUNWAY EXCURSION MAINTENANCE PRACTICES (CONDITIONAL INSPECTION)

B. Hard Landing

1) *The hard landing conditional inspection is for hard landings at any landing weight.*
2) *If the pilot determines the airplane had a hard landing, a structural inspection is necessary.*
    a. *If all three of the following conditions are met, then the inspection of the nose landing gear is not required:*
        1. *The flight crew reported that the landing was not a hard nose gear landing, or did not include a hard nose gear touchdown after derotation.*
        2. *The landing was not a three-point landing.*
        3. *The landing was not a nose gear first landing.*

NOTE: ALL nose gear inspections are waived under these conditions, not just the NLG axle level check that requires jacking.

b. *If a structural examination/inspection is necessary, do the procedure "Phase I Inspection" in this section.*

c. *For landings at or below maximum design landing weight on airplanes with flight data recording systems capable of at least eight (8) samples per second, the following can be used:*

An indication of a hard landing on the main landing gear is a peak recorded vertical acceleration that exceeds 2.1 G (incremental 1.1 G). This vertical accelerometer data must be measured by the flight data recorder accelerometer at a data sampling rate of at least eight (8) samples per second.

This G-level threshold is valid for a conventional landing impact with no more than 2 degrees of airplane roll, main landing gear touchdown first and normal rotation onto the nose gear. For a hard landing that is a hard nose landing or is accompanied by more than two degrees of roll at the time of main landing gear impact, the recorded peak acceleration can be significantly less than 2.1 G, but a hard landing inspection may still be necessary.

d. *For landing at or below maximum design landing weight on airplanes with recording systems capable of at least sixteen (16) samples per second, the following can be used: An indication of a hard landing on the main landing gear is a peak recorded vertical acceleration that exceeds 2.2 G (incremental 1.2 G). This vertical accelerometer data must be measured by the flight data recorder accelerometer at a data sampling rate of at least sixteen (16) samples per second.*

This G-level threshold is valid for a conventional landing impact with no more than 2 degrees of airplane roll, main landing gear touchdown first and normal rotation onto the nose gear. For a hard landing that is a hard nose landing or is accompanied by more than two degrees of roll at the time of main landing gear impact, the recorded peak acceleration can be significantly less than 2.2 G, but a hard landing inspection may still be necessary.

1.18.3 Crew Resource Management

Crew Resource Management is the effective use of all available resources for flight crew personnel to assure a safe and efficient operation, reducing error, avoiding stress and increasing efficiency.

(SKYbrary. https://skybrary.aero/index.php/Crew_Resource_Management_(CRM))

1.19 Useful or effective investigation techniques

Not Applicable.

2.0 ANALYSIS

2.1 General

The crew were qualified and certified to operate the flight. The aircraft had a valid Certificate of Airworthiness. This analysis focuses on the crew performance under the prevailing weather conditions and what influenced the decision to continue the approach.

2.2 Conduct of the flight

The aircraft departed Port Harcourt and was dispatched with fuel endurance of 2 hours 35 minutes. The flight had operated safely until final approach into Lagos neither had the crew expressed concern about fuel that could have influenced the decision to land. It can therefore be deduced that there was sufficient fuel with which to have executed a go-around or diverted to an alternate airfield.

The updates given on the condition of the weather as the aircraft approached the runway indicated deteriorating weather conditions. The Control Tower warned of a thunderstorm on the take-off path Runway 18R, and gave a wind shear alert. These updates were acknowledged by the crew.

The company's Ops Manual Part A states as a general rule, that avoiding thunderstorms is the best policy and that crew should not take-off or land into an approaching thunderstorm. This may have informed the co-pilot's reservations about continuing the approach, when he expressed concern about the stability of the approach, on at least two occasions. The Captain affirmed that he had control of the aircraft. There was no indication that the warning of a wind shear condition was a source of concern to the crew. From all indications, the pilot flying was confident about his ability to land the aircraft under the prevailing conditions.

The FDR data analysis showed that autopilot was disconnected at about 300 ft AGL, about 28 seconds before touchdown, at which point the aircraft was aligned with the localizer and glideslope signals, indicating a stable profile. The aircraft at this point was 1 NM to touchdown and wind direction and speed was 130^{o} at 30 knots. The plots show that the flight became unstable shortly after the autopilot disengaged. At about 61 ft, the aircraft was in a 10^{o} roll to the left with left aileron position at about +15^{o} and right aileron position was -5.9^{o}.

At 50 ft AGL, about 3 seconds before touchdown, the aircraft was descending at a rate of more than 1,500 fpm, with a roll angle of about 13^{o} to the left, 1.37^{o} nose up attitude and airspeed of about 161 knots. Aileron position from an analysis of the FDR data plot, showed that the aircraft was recovering from the roll to the left as the aircraft descended below 50 ft AGL, corresponding with reduction in both aileron positions. At this point, wind direction and speed was 126^{o} at 29 knots.

At about 27 ft, left and right aileron positions were -10.4 and +10.9 respectively and continued to increase until touchdown, as the aircraft rolled further to the right. At about 17 ft, the aircraft had a 7^{o} roll to the right. Right aileron position increased progressively until touchdown, indicating a control input to roll the aircraft to the left in an effort to restore the aircraft to wings level for touchdown.

At touchdown, the aircraft was in a 5^{o} roll to the right; aileron left position was about -11^{o} while right aileron position was about +14^{o}. The aircraft touched down at a computed airspeed of 146 knots with a pitch of 0.35^{o}.

The FDR plot showed that vertical speed changed, within 20 seconds, from about 112 fpm rate of climb at about 219 ft AGL to about 1,550 fpm rate of descent at 43 ft AGL. This indicates a high rate of descent. The transient change in sink rate may indicate the extent of weather influence on the flight path especially in the last 20 seconds of flight,

notably the windshear phenomenon earlier alerted by ATC. At touchdown, the vertical speed was about 500 fpm.

It can be deduced that the left roll at 50 ft AGL from which the PF tried to recover was responsible for the impact of the right engine and thrust reverser cowlings with the runway on touchdown.

The **Recommended Elements of a Stabilized Approach** in the company's Ops Manual clarifies that an approach is said to be stabilized if sink rate is no greater than 1,000 fpm; and only small changes in heading/pitch are required to maintain the correct flight path.

Aircraft heading over the period of one minute from the 2 NM position until touchdown varied from about 180^{o} to 174^{o} although minimal drift was observed. The FDR data also showed that directional control was maintained with minimal rudder input up until touchdown. V_{REF} was maintained within the limits of a stabilized approach according to Ops Manual Section 3.23A

The unavailability of a CVR recording makes it difficult to account for certain other issues of crew coordination and performance which might have contributed to the occurrence.

2.3 Hard landing

Witness marks on the aircraft indicated that the right engine cowling impacted the ground on touchdown. The scuff marks on the sidewall of the right outboard main wheel (No. 4) tyre indicated abrasion from contact with the ground on touchdown. The displaced landing gear door clamps on the main landing gear oleo struts and witness marks on the oleo strut inner cylinder as evident during post-incident inspection, are also an indication of a landing in excess of normal operation.

FDR data shows that the vertical acceleration spiked to about 3.4G just before main gear touchdown.

2.4 Weather

The meteorological information available to the crew at the time of the occurrence indicated deteriorating weather conditions. At 19:24 h, TWR reported that the approach path was clear but there was thunderstorm on the take-off path Runway 18R.

At 19:32 h, the crew called Lagos TWR and reported 2 NM to touchdown. The TWR acknowledged and transmitted weather condition indicating wind 210°/11 knots, and also issued a wind shear alert of 60 knots on the approach path of Runway 18R.

According to FDR data, the aircraft at 2 NM was at about 600 ft, maintaining airspeed of about 153 knots with a wind speed of about 33 knots. At 1 NM, wind speed was captured at 36 knots. Radio height and computed airspeed were 283 ft and 154 knots respectively.

It is evident that the crew was provided with sufficient information by the ATC, to decide whether to continue the approach under the prevailing weather conditions. An analysis of the meteorological report also showed an improvement in weather conditions at 2000Z indicating that a decision to pick a hold over the station or diverting to an alternate airfield, were options the crew might not have considered.

2.5 Crew Resource Management (CRM)

The investigation revealed that the decision to continue the approach was not mutually agreed to in the cockpit. The PM's request for a go-around could have served as a prompt to reconsider the options available to the crew.

Effective CRM entails the harmonization and utilization of all available crew resources at hand in the making and execution of flight decisions, in the interest of safety. There was no evidence to show that the options of executing a go-around, picking a hold over the station or diverting to alternate airfield were discussed. Inadequate CRM in this incident increased the flight's operational risk factors and could have resulted in dire consequences.

3.0 CONCLUSIONS

3.1 Findings

1. The flight crew were certified and qualified to conduct the flight.
2. The aircraft had a valid certificate of airworthiness.
3. The Captain was the Pilot Flying while the First Officer was the Pilot Monitoring.
4. On final approach, the crew were alerted by ATC of thunderstorm over the station and were issued a windshear alert.
5. The aircraft encountered high crosswinds at short finals.
6. The aircraft was taxied to the apron and the passengers disembarked normally without injury.
7. A post-incident inspection of the aircraft showed substantial damage to the aircraft structure and its No. 2 engine cowling.
8. AIB was notified three weeks after the occurrence after a telephone call by a passenger who had been on the incident flight.
9. The CVR recording of the occurrence was overwritten.

3.2 Causal factor

Inadequate recovery inputs from high rate of descent.

3.3 Contributory factor

1. High rate of descent occasioned by sudden wind change at short finals.
2. Inadequate crew resource management in the cockpit.

4.0 SAFETY RECOMMENDATIONS

4.1 Safety Recommendation 2021-038

Air Peace Limited should ensure that flight crew adhere strictly to Operations Manual procedure for flying in adverse weather conditions.