PRELIMINARY REPORT ON SERIOUS INCIDENT INVOLVING BOEING 737-500 AIRCRAFT BELONGING TO AZMAN AIR SERVICES LIMITED WITH REGISTRATION MARKS 5N-AIS WHICH OCCURRED DURING APPROACH TO PORT HARCOURT INTERNATIONAL AIRPORT ON 3RD JANUARY, 2019

Registered Owner and Operator:	Azman Air Services Limited
Aircraft Type and Model:	Boeing 737-5L9
Manufacturer:	Boeing Aircraft Company
Date of Manufacture:	September, 1998
Registration Number:	5N-AIS
Serial Number:	29235
Location:	On Approach to Port Harcourt International Airport
Date and Time:	3rd January, 2019 at about 10:55 h (All times in this report are local time (UTC +1) unless otherwise stated)

INTRODUCTION

Accident Investigation Bureau (AIB) was notified of the serious incident by the operator on 6th January, 2019. Investigators were dispatched to Port Harcourt same day and commenced post incident assessments, under the provisions of Civil Aviation (Investigation of Air Accidents and Incidents) Regulations 2016 and ICAO Annex 13.

The purpose of this preliminary report is to provide details of the initial facts, discussions and findings surrounding the occurrence; it includes information gathered from witness statements, flight data recorder and a preliminary inspection of the aircraft. The investigation is ongoing.

FACTUAL INFORMATION

1.1 History of the flight

On 3rd January, 2019, at about 10:10 h. 2019, a Boeing 737-500 aircraft with registration marks 5N-AIS operated by Azman Air Services Limited ~~on~~ a scheduled commercial flight AZM 2316, departed Lagos for Port Harcourt on an Instrument Flight Rule (IFR) Flight Plan with 109 passengers and five crew on board. The fuel uplift was 8, 900kg. The flight was the first flight of the day for the aircraft. There was no reported technical fault or observation on both engines during the previous flight.

The take-off and climb out phase was normal. Captain was the Pilot Flying (PF) and Co-pilot was the Pilot Monitoring (PM). The aircraft levelled off at a cruising altitude of 29,000 ft (FL 290). According to the Flight Data Recorder (FDR), Engines No. 1 and No. 2 were both showing 84.6% N_1 before the engine No 2 malfunction.

According to the flight crew, at some point during the cruise, about 20-25 minutes into the flight, they heard a loud bang which lasted for about 4-5 seconds followed by a yaw to the right. However, at about 10:28 h FDR data revealed that Engine No 2 N_1 value start decreasing for about 4.3 seconds (which corresponds to the point at which the crew heard a bang and experienced a yaw).

The flight crew also stated that engine parameters look normal at that time and in addition, the Purser reported that there was nothing unusual noticed in the cabin after the loud bang. The flight crew therefore assumed that the bang was associated with cargo shift. The aircraft was on Autopilot (A/P) and Auto Throttle (A/T).

At about 10:42 h, Port Harcourt Approach cleared the aircraft for a straight in approach on runway 21; Flap 15^{o} selected, Localizer captured, Glideslope captured and the gears were selected to DOWN position. As the A/P disengaged, the aircraft suddenly yawed to the right accompanied by severe vibration and also thrust asymmetry was noticed. At that time, Glide was two Dots below and field was NOT in sight. The PM noticed No.1 Engine vibration indicated 3.0 to 3.5 units, No.1 Engine N_1 was 65%, No.2 Engine N_1 was 35% and the No.2 Oil Filter Bypass Light came ON. This led to precautionary shut down of No 2 Engine by the crew.

FDR data also indicated that, at one point before the approach, the figure of engine instruments were indicating almost the same with no difference until about 10:53 h when the crew advanced the throttles individually in order to verify the engine out puts. At that time, the crew noticed that No 2 engine did not respond appropriately to the throttle movement. FDR data also indicated that No 2 Engine was shut down five minutes after the verification of the engine output.

In order to figure out what was happening, the Captain handed over control to the Co-pilot. The crew accomplished the Severe Engine/Damage Checklist. However, the first approach became unstable and the crew executed a Missed Approach at about 10:55 h.

At about 11:09 h, when the ATC cleared the crew for the second approach, the response was that they were not ready for approach at that moment. However, they requested for vectors as they were having problem with No 2 engine.

During the second approach to runway 21, the aircraft came high on the approach and was off track of the runway centreline. At about 11: 19 h, the crew declared emergency and executed a second missed approach. However, the crew were able to land the aircraft safely on runway 21 after the third approach at about 11:35 h.

The Airport Rescue and Fire Fighting Service (ARFFS) had already positioned its fire fighter on standby close to runway 21 in readiness of any emergency on the distressed aircraft. After landing, the aircraft taxied, exited the active runway and escorted to the apron where the occupants disembarked normally without any injuries.

The incident occurred in day time in an Instrument Meteorological Condition (IMC).

1.2 Injuries to persons

INJURIES	CREW	PASSENGERS	TOTAL IN THE AIRCRAFT	OTHERS
FATAL	Nil	Nil	Nil	Nil
SERIOUS	Nil	Nil	Nil	Nil
MINOR	Nil	Nil	Nil	Nil
NONE	5	109	114	Nil
TOTAL	5	109	114	Nil

1.3 Damage to Aircraft

The aircraft was not damaged

Figure 1: The aircraft after the incident

1.4 Other damage

Nil

1.5 Personnel information

1.5.1 Captain (Pilot Flying)

Nationality:	Nigerian
Gender:	Male
Age:	43 years
Licence No.:	ATPL 5063 (A)
Licence Validity:	5th March, 2020
Aircraft Ratings:	Part 1: B737-300/500, HS-125/800XP Part 2: EMB-170/190
Medical Certificate:	Valid till 25 Nov. 2019
Simulator:	Valid till 29 April 2019
Proficiency Check:	9th December, 2018
Route/Line Check:	9th December, 2018
Total Flying Time:	3, 724 h
Total on Type:	92 h
Total on Type (PIC):	92 h
Last 90 Days:	Not Available
Last 28 Days:	Not Available
Last 24 Hours:	Nil

1.5.2 First Officer (Pilot Monitoring)

Nationality:	Nigerian
Gender:	Male
Age:	24 years
Licence No.:	CPL 7456 (A)
Licence Validity:	18th January, 2023
Aircraft Ratings:	Part 2: B737-300/500
Medical Certificate:	Valid till 9th December, 2019

Simulator:	Valid till 28th March, 2019
Proficiency Check:	28th October, 2018
Route/Line Check:	28th October, 2018
Total Flying Time:	629 h
Total on Type:	431 h
Total on Type (PIC):	0
Last 90 Days:	122 h
Last 28 Days:	25 h
Last 24 Hours:	Nil

1.6 Aircraft Information

Type:	B737-5L9
Manufacturer:	Boeing Aircraft Company
Date of Manufacture:	September, 1998
Serial No:	29235
Registered Owner/Operator:	Azman Air Services Limited
Registration Marks:	5N-AIS
C of A:	Valid till 30th November, 2019
Certificate of Insurance:	Valid till 25th January, 2019
Certificate of Registration:	Issued on 30th November, 2016
Noise Certificate:	Issued on 30th November, 2016
Airframe Time:	34, 675 h

1.6.2 Power Plant

Engine Model:	CFM 56-3C-1
No. 2:	
Serial No.:	858813
TSN:	44, 143 h
CSN:	30, 657
Year of Manufacture:	Not Available
Type of Fuel Used	Jet A1

1.7 Meteorological Information

Time:	0900 UTC
Wind:	220^0/08kts
Visibility:	5km
Weather:	Haze
Cloud:	NSC
Temperature:	29^0C/08^0C
QNH:	1013

1.8 Aids to Navigation

'POT' VOR/DME	113.5 MHZ	- 'S'
'IPC' ILS/DME	110.3 MHZ	- 'S'

1.9 Communications

There was effective, two way communications between the crew, Lagos and Port Harcourt ATCs

1.10 Aerodrome Information

Port Harcourt International Airport has a Single bi-directional asphalt coated runway 03/21 that is 3000m (9, 990ft) long and has an elevation of 91 ft. The aerodrome co-ordinates are: 05^{0}01'38.6626"N and 006^{0}56'21.3653"E.

1.11 Flight Recorders

The aircraft is fitted with Flight Data Recorder and Cockpit Voice Recorder with particulars as tabulated below:

	Flight Data Recorder	**Cockpit Voice Recorder**
Manufacturer	Honeywell International Inc.	Fairchild
Part Number	980-4700-042	S200-0012-00
Serial Number	6798	01156
Model	SSFDR	A200S

1.12 Wreckage and Impact Information

Not Applicable

1.13 Medical and Pathological Information

No medical or pathological tests were conducted

1.14 Fire

There was no fire outbreak

1.15 Survival Aspect

The serious incident was survivable as there was no impact with terrain, there was liveable volume and passengers were properly briefed by the crew.

1.16 Test and Research

Nil

Initial Findings

1. The aircraft has a valid certificate of airworthiness.
2. The mass and centre of gravity of the aircraft were within the prescribed limits.
3. The flight crew was properly licensed, medically fit and adequately rested to operate the flight.
4. The Captain has 92 hours on type while the First Officer has 431 hours on type.
5. The take-off and climb out phase was normal
6. The aircraft was at a cruising altitude of 29, 000ft and about 20 -25 minutes into the flight when the crew heard a loud bang followed by a yaw to the right.
7. The flight crew assumed that the bang was associated with cargo shift.
8. During the first approach, with the aircraft configured for landing; the aircraft yawed to the right followed by severe vibration and thrust asymmetry after the disengagement of the A/P.
9. The crew carried out a precautionary shut down of No. 2 engine when it noticed some malfunctions including the illumination of the No.2 Oil Filter Bypass Light during the approach.
10. At about 11:19 h, the crew declared emergency to the ATC
11. There was effective, two way communications between the crew, Lagos and Port Harcourt ATCs

12. The crew carried out two missed approaches with one engine inoperative but landed safely at the third attempt.
13. Technical log entry dated 13th December, 2018 indicated as follows: "C/O ALL '1A' TASKS ON ENG #2, REF NO: AZPL/AIS/1218/117.
14. According to maintenance statement in the Technical log book, the next inspection is '2A' and would be due on 22nd February, 2019 at an airframe time of 34, 885:55 hours.

Immediate Safety Recommendations

- ***NCAA should ensure Azman Air Services Limited immediately takes further necessary steps to ensure that it review the training of the incident flight crew in order to be able to understand and recognise engine failure/malfunctions and its effect (s) at every phase of flight before they are allowed to resume flight duties.***

Further Investigative actions

1. Spectrometric Oil Analysis
2. Borescope Inspection
3. Magnetic Chip Detector
4. Possible Engine Tear down.