

Aircraft Accident Investigation Bureau of Myanmar

The aircraft accident investigation bureau (AAIB) is the aircraft investigation authority in Myanmar responsible to the Ministry of Transport and Communications. Its mission is to promote aviation safety through the conduct of independent and objective investigations into air accident and incidents.

For aviation related investigations, the AAIB conducts the investigations in accordance with Myanmar Aircraft Act and Myanmar Aircraft Accident and Incident Investigation Rules and Annex-13 to the Convention on International Civil Aviation.

In carrying out the investigations, the AAIB adheres to ICAO's stated objective, which is as follows:

“The sole objective of the investigation of an accident or incident shall be the prevention of accidents and incidents. It is not the purpose of this activity to apportion blame or liability.”

Accordingly, it is inappropriate that AAIB reports should not be used to assign fault or blame or determine liability, since neither the investigation nor the reporting process has been undertaken for that purpose.

**FINAL REPORT OF ACCIDENT OF A COLLISION WITH TERRAIN
INVOLVING BIMAN BANGLADESH AIRLINES AIRCRAFT
BOMBARDIER DHC-8-402, REGISTERED S2-AGQ AT YANGON
INTERNATIONAL AIRPORT, MYANMAR ON 8 MAY, 2019**

SYNOPSIS

At 18:52 on 8 May 2019, Biman Bangladesh Airlines-Bombardier DHC-8-402 aircraft, registered (S2-AGQ), which was operating on a schedule passenger flight from Hazrat Shah Jalal International Airport (VGHS), Bangladesh to Yangon International Airport (VYYY), Myanmar experienced a collision with terrain on runway 03 and broke into three sections. On board Bombardier DHC-8-402 aircraft, registered (S2-AGQ), were the Pilot in command (PIC), first officer (FO), two cabin crew, two aircraft engineers and 28 passengers including one infant. There was no fire. The aircraft was destroyed and twenty occupants were reportedly injured and taken to the hospitals. The Aircraft Accident Investigation Bureau of Myanmar classified the occurrence as an accident.

Aircraft Details

Registered owner and operator	: Biman Bangladesh Airlines
Aircraft type	: Bombardier DHC-8-402
Nationality	: Bangladesh
Registration	: S2-AGQ
Place of Occurrence	: Yangon International Airport (VYYY), N 16° 53' 52", E 96° 07' 34"
Date & Time	: 8 May 2019 at 18:52
Type of operation	: Scheduled Passenger International Flight
Phase of operation	: Landing on Runway 21
Persons on Board	: Four Crew, two aircraft engineers and twenty eight passengers including one infant

1. FACTUAL INFORMATION

All times used in this report are Myanmar Standard Time. Myanmar Standard Time (MST) is the standard time in Myanmar, 06:30 hours ahead of Coordinated Universal Time (UTC).

1.1 History of the flight

The route of the aircraft on that day was DAC-RGN-DAC. At 18:03 the Bombardier DHC-8-402 aircraft, registered (S2-AGQ) contacted Yangon control tower and at 18:16 had ILS established and reported to the Yangon control tower. Due to adverse weather, Yangon control tower asked them to execute a go-around and the aerodrome operations was closed for the aviation safety for about 30 minutes. When the weather condition got better, the aerodrome operations was opened. And then the DHC-8-402 aircraft, registered S2-AGQ made an RNP approach because only localizer was available at that moment. While the Bombardier DHC-8-402 aircraft was making an approach to runway 21, it was a bit higher than on glide slope 3 degree and touched down on runway 21, remaining on the ground for upwards of 7 seconds, but the aircraft ran parallel to the runway, and then it flew up in the air up to 44 ft above the ground and sank again and collided with runway 03 and slid forward out of the runway and came to a complete stop on the over-run of the runway 03. There was no fire. All gears were collapsed and fuselage was broken into three sections.



Figure (1) Layout of Accident Site



Figure (2) Layout of Accident Site

1.2 Injuries to Persons

1.2.1 Biman Bangladesh Airlines

Injuries	Crew	Passengers	Other	Total
Fatal	0	0	0	0
Serious	4	8	0	12
Minor/ None	1/1	7/13	-	8/14
Total	6	28	0	34

1.3 Damage to Aircraft

- Aircraft Radome was cracked and damaged.
- Aircraft Nose Landing Gear was collapsed and folded.
- Aircraft Main Landing Gears' shock absorbers were broken and damaged.
- Aircraft Right hand Wing was broken at the attachment point with the fuselage.
- Left and Right Propeller Blades were broken into pieces.

- (f) Aircraft Fuselage interior was broken and destroyed.
- (g) Aircraft Fuselage broke into three sections.
- (h) Cockpit door did not open due to fuselage damage.
- (i) Aircraft Emergency locator Transmitter (ELT) transmitted the distress signal.



Figure (3) Final position of the aircraft on the overrun of Runway 03



Figure (4) Final position of the aircraft on the overrun of Runway 03



Figure (5) Damaged Fuselage of the Aircraft



Figure (6) Damaged Radome of the Aircraft



Figure (7) Damaged Propellers of the Aircraft

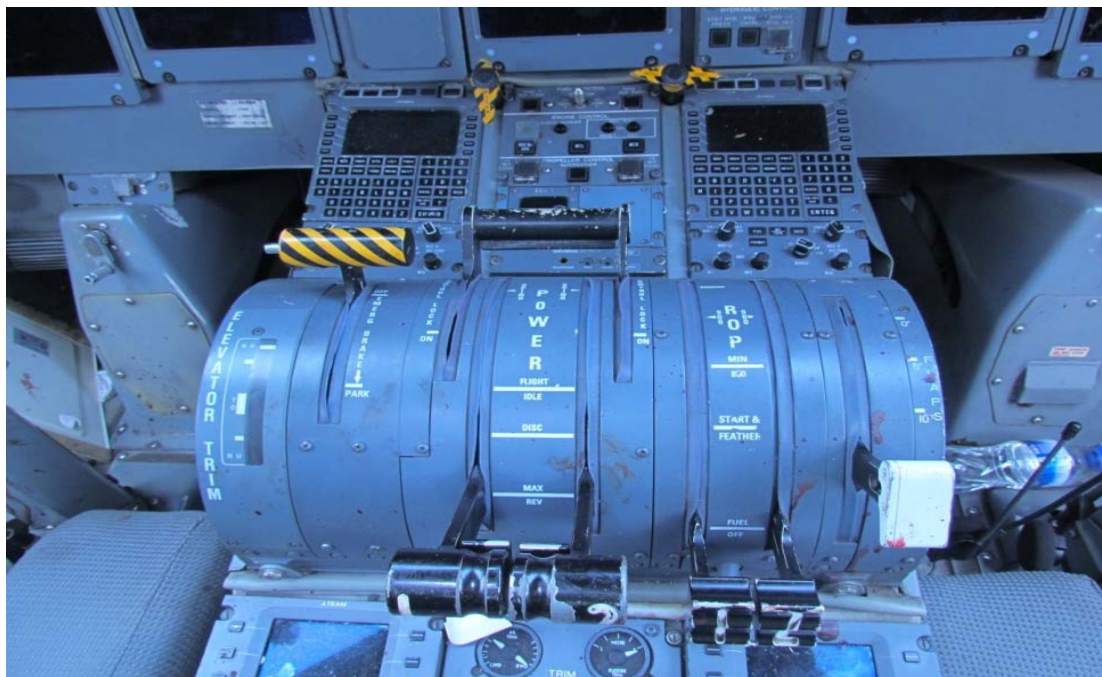


Figure (8) The Cockpit view of the Aircraft



Figure (9) Right hand wing of Aircraft broken at the attachment point with the fuselage



Figure (10) Damaged main landing gears of the Aircraft



Figure (11) Escape hatch was opened to rescue the flight crew



Figure (12) Damaged Cabin Interiors of the Aircraft



Figure (13) The debris of the Aircraft scattered on the ground



Figure (14) The debris of the Aircraft scattered on the ground



Figure (15) Wheel tracks and propeller striking marks on the overrun



Figure(16) Wheel marks of the Aircraft on the overrun

1.4 Other Damage

There was no other damage due to the runway excursion accident.

1.5 Personnel Information

Pilot in Command (Biman Bangladesh Airlines)

Age	: 51 years
Licence	: Air Transport Pilot Licence
Licence issued date	: 20 January 2016
Total hours	: 9646:20 hrs
On type	: 1474:45hrs
Medical expire	: 16 September 2019
Line check date	: 24 September 2018
Type rating check date	: 27 November 2015
Last 90 days	: 173:35 hrs
Last 30 days	: 56:40 hrs
Last 24 hours	: 1:30 hrs
Rest before duty	: 17:50 hrs

Co-Pilot (Biman Bangladesh Airlines)

Age	: 25 years
Licence	: Commercial Pilot Licence
Licence issued date	: 23 June 2016
Total hours	: 580:40 hrs
On type	: 405:15 hrs
Medical expire	: 15 August 2019
Line Check date	: 5 September 2018
Type rating check date	: 6 April 2018
Last 90 days	: 201:45 hrs
Last 30 days	: 91:20 hrs
Last 24 hours	: 05:15 hrs
Rest before duty	: 15:50 hrs

1.6 Aircraft information

Biman Bangladesh Airlines Aircraft

Manufacture	: Bombardier
Type	: DHC-8-402
Serial number	: 4367
Date of Manufacture	: June 2011
Total Airframehours	: 8115:22 hrs
Certificate of Registration	: S2-AGQ
C of A issue date	: Valid up to 04-04-2020
Last Time Check	: 26 January 2019
Total flying hours	: 8115:22 hrs

1.7 Meteorological Information

The METAR weather reported at Yangon International Airport on the 8th May 2019 at 18:30 was variable winds direction at 10 knots with gust of 20knots, visibility 3000meters, thunderstorm with rain, broken clouds at 1000ft, few clouds at 8000ft, temperature 30°C, dew point 27°C and regional atmospheric pressure 1003hpa.

The METAR reported on the 8th May 2019 at 19:00 was wind speed 08knots from 30 degrees, visibility 4000meters, thunderstorm with rain, broken clouds at 1200ft, few clouds at 1600feet above ground level, overcast clouds at 10000ft, temperature 30°C, dew point 27°C and regional atmospheric pressure 1004hpa.

1.8 Aid to Navigation

Yangon International Airport has been equipped with the following facilities.

VYYY AD 2.19 RADIO NAVIGATION AND LANDING AIDS

Type of aid CAT of ILS/MLS (MAG VAR)	ID	Frequency	Hours of operation	Transmitting antenna coordinates	Elevation of DME transmitting antenna	Remarks
1	2	3	4	5	6	7
DVOR/DME	BGO	CH 73X 112.6 MHz	H24	171906.58N 0963111.55E	38 FT	Coverage: 180 NM Em: A9W
DVOR/DME	HGU	CH 70X 112.3 MHz	H24	170449.87N 0961502.49E	49 FT	12 NM from THR 21 Coverage: 130 NM Em: A9W
NDB	MDS	397 kHz	H24	165205.78N 0960621.54E	Not applicable	1.5 NM from THR 03 Coverage: 50 NM Em: NON/A2A RWY 03
ILS/DME/GP Nil	IYGN	CH 36X 333.8 MHz	H24	165519.50N 0960830.90E	50 FT	Coverage: 10 NM Glide slope: 3° Em: A3E RWY 21
ILS/LLZ Nil	IYGN	109.9 MHz	H24	165347.14N 0960733.09E	Not applicable	Coverage: 12 NM Em: A3E RWY 21

At the time of the aircraft approach, the Glide Slope was out of order due to the thunderstorm strike.

1.9 Communication

Communication facilities in Yangon International Airport are follows:

VYYY AD 2.18 ATS COMMUNICATION FACILITIES

Service designation	Call sign	Channel	Hours of operation	Remarks
1	2	3	4	5
MINGALADON APPROACH	MINGALADON APPROACH: EN	119.700 MHz	H24	Nil
MINGALADON TOWER	MINGALADON TOWER: EN	118.100 MHz	H24	Nil
ATIS	YANGON INTERNATIONAL AIRPORT INFORMATION: EN	128.400 MHz	H24	Nil
MINGALADON GROUND	MINGALADON GROUND:	121.900 MHz	H24	Nil

As per record the communication on that day was normal.

1.10 Aerodrome Information

Yangon International Airport has one main runway 03/21 with a length of 11200ft at an elevation of 110ft above mean sea level and is certified for both VFR and IFR flight. Runway Strength is 230000kg and the airport has an ATC control tower, controlling class B airspace with radar surveillance facilities.

It is a certificated aerodrome and aerodrome manual has been developed and implemented since 2010. The operation hours are 24 hours around. The aerodrome category for the firefighting is CAT 9. Because of this accident the aerodrome operations had to stop for about 2 hours and then reopened with some restrictions and some flight had to divert the adjacent airports and some were cancelled and delayed.

1.11 Recorders

The aircraft's cockpit voice recorder and flight data recorder were removed and transported by AAIB (Myanmar) staff for read out at the Australian Transport Safety Bureau (ATSB) facilities.

1.11.1 Flight Data Recorder

Approximately 533 hours of data was recorded on the solid state flight data recorder (FDR). The FDR was a Universal Avionics FDR-25, Part Number 1607-00-00 and Serial Number 231.



Figure (17) Flight Data Recorder

1.11.2 Cockpit Voice Recorder

2 hrs 2min 39 sec of audio was recorded on the cockpit voice recorder (CVR). The CVR was a Universal Avionics CVR-120A model , Part Number 1606-00-01 and Serial Number 461.



Figure (18) Cockpit Voice Recorder

1.12 Wreckage, Site and Impact Information

The coordinates of accident site is Latitude N 16°53' 52", Longitude E 96° 07'34".When Aircraft Accident Investigation Bureau (AAIB), Myanmar investigators arrived at the occurrence site, the aircraft was on the overrun muddy turf area of the runway 03. It was raining and the runway was wet. Some FOD debris and broken pieces from the aircraft were found on the runway about 1500ft from runway 03 threshold. Some pieces from aircraft were on the ground near the disabled aircraft . Fire Fighters, airport and airlines personnel were busy with their respective activities for the reopening the airport operation and necessary action.

Measurements and photographs were taken of the occurrence site, ground markings and tracks were inspected and casual interviews were conducted among witnesses.

1.13 Medical and Pathological Information

Four aircrew members and eight passengers were seriously injured and another two crew and six passengers were minor injured in this accident. They were admitted to two hospitals in Yangon on 8, May 2019. Eleven injured persons (including six crew members) were transferred to Bangladesh on 10, May 2019. One injured passenger was transferred to Bangkok on 11, May 2019. Two injured passengers were discharged from the hospital on 12, May 2019. Another injured passengers had been hospitalized for some days (about 45 days) and there had been under treatment, after discharging from the hospital there were follow up visits to hospital.

1.14 Fire

There was no fire before and after the accident.

1.15 Survival Aspects

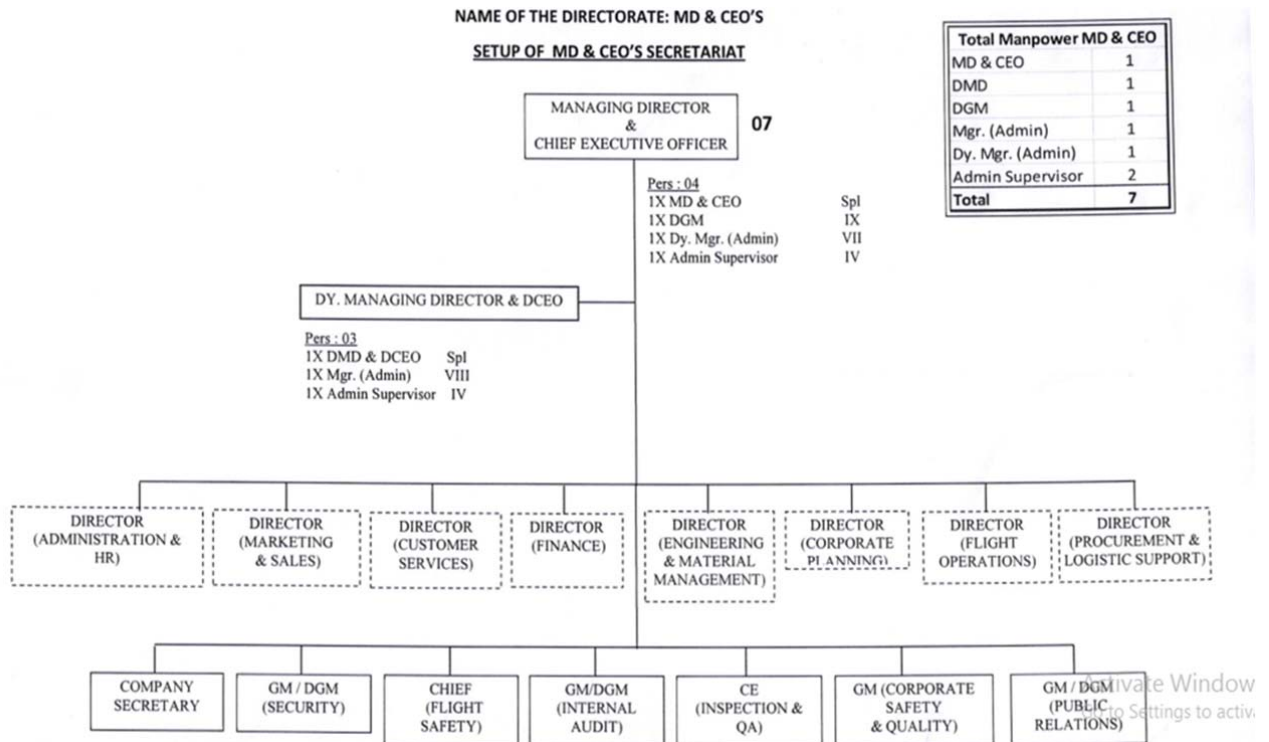
Aircraft engineer opened the front emergency exit door and threw it outside as soon as the aircraft came to halt. The cabin crew could not initiate emergency evacuation. All passengers and some crew came out from the aircraft by their own means with the support from each other. Aircraft rescue and fire fighting vehicles deployed to the scene immediately after getting accident information from ATC. ARFF vehicles arrived at the scene within 3 minutes. The cockpit door was unable to open due to cabin fuselage damage. ARFF team opened the escape hatch and took measures to avoid any fire from the engines and wings and they applied foam blanket to the aircraft to cool down the fuselage and undercarriage due to skidding high temperature. So that the pilot and copilot came out from the aircraft with the help of airport rescue fire fighters.

DCA personnel, the airport personnel, the aviation police, the airline personnel, and the ATC personnel arrived at the scene and provided care and family assistance as necessary. Twenty injured persons (including six crew members) were taken to the Ar Yu International hospital and the Parami Special hospital.

1.16 Organizational and Management Information

1.16.1 Biman Bangladesh Airlines

Biman Bangladesh airlines is the national flag carrier, which is fully owned and operated by the government of Bangladesh. The corporate body of Biman, namely Bangladesh Biman corporation, is doing business Biman Bangladesh airlines under the Ministry of Civil Aviation and Tourism. Biman was established as of a corporation on 27, October 1972 with vision to protect Biman Bangladesh airlines Ltd in the aviation market as a world – class airline. The airline provides international passenger and cargo services to multiple destinations and has air service agreements with 42 countries. It has 16 numbers of fleet such as Boeing 787-8, Boeing 777-300 ER, Boeing 737-800 and Bombardier DHC-8-402. Biman served 23 destinations, of which 15 were international in December 2016. Organizational structure of Biman Bangladesh airlines headed by Managing Director and Chief Executive Officer, set up of MD and CEO's secretariat as below.



1.17 Additional Information

1.17.1 Testimony of Biman Bangladesh Airlines Pilot

He stated that when he made the approach, there was a weather. So he couldn't know the airport visibility that was good or not. So he requested ATC to make an approach. ATC replied the visibility was good but there was a heavy rain on the approach. So he made the approach with Instrument Landing System (ILS). When he was from flight level 2500ft to 2000ft, ATC informed him to execute a go-around because it was already raining at that time. So he made a go-around. When he climbed initially from flight level 2000ft to 3000ft and 5000ft and then 8000ft, he heard another two aircraft was calling ATC to make an approach before him. The weather was bad also. ATC instructed them to go again to HGU at flight level 8000ft. After that the first aircraft was below a maintain approach and second one came to approach. At that time it was raining, ATC told him visibility was about 1 to 2km and the previous aircraft reported weather was the wind between 20knots to 25knots head. He was cleared for the approach and visibility was low immediately. When he made a normal approach, it was raining. ATC reported him no ILS approach because glide slope was out of service at that time. So the first step approach, he did not get the glide slope and he actually made localizer approach/RNP approach. When he was crossing the runway, it was raining on the final approach path about 1500 ft. While the flight was on the center line, approach was good, but slightly high because that was non precision approach. So he saw the PAPI light was not two red, two white and it was one red, three white. And then he made final approach and normal came down on the runway. It was too raining to touch down the runway. After that he could get something just like a boom. He didn't know that what happened to the aircraft and liked that somebody had just pushed him down. After touching down, the aircraft was rolling on the runway. But it was sudden gusty wind or something took the aircraft and it was going up again. And then aircraft took him down and he couldn't direct to control it. It was a complicated control of the aircraft. Some gear was collapsed and something was going out of it. Although he made shut down the engine but aircraft was jumped and boom. So he called the cabin crew for evacuation but he could not make it. So he made an emergency switch on

and engine shut down. And then he saw the first aids team. Although he was injured, he gave briefing. His ground engineer who worked for rating the compulsory rating of that flight was bad injured. And then he jumped out from his aircraft.

1.17.2 Testimony of Biman Bangladesh Airlines First Officer

He stated that when he came to an approach, he saw a weather it was lightening and raining heavily. ATC requested him to execute a go-around. So he flew at flight level 8000ft and then he hold there. At that time he heard that two aircraft requested to make an approach from ATC . So he was starting the sequence and he made an approach. But there was no glide slope available. So he made the VOR approach because ATC ordered him to make the localizer approach. While he made the approach, ATC told him that the visibility was 7km. At that time there was raining heavily but he could see the runway. So he made the approach continue and he landed the aircraft smoothly. After landing, he was rolling on the runway about 4 to 5 seconds, he thought that there was a cross wind. At that time a gusty wind took his aircraft just like air borne and then the aircraft was dived again.

1.17.3 Testimony of Biman Bangladesh Airlines Cabin Crew

He stated that the weather was good for the whole flight. When the Pilot tried to land the aircraft before he had given cabin clearance that cabin was secured for landing. The pilot told him that okay, sit down and fasten seat-belt tightly because there was weather. After a few minute he felt that aircraft was over shoot. And second time pilot commanded that Cabin Crew Landing Situation. At the moment of landing, he thought that it was good landing. But a few seconds later, he felt that the aircraft was tried to break hardly. Finally the aircraft was stopped right side of the Runway.

1.17.4 Testimony of Biman Bangladesh Airlines Aircraft Engineer

He stated that he had no job during the flight when he was staying at the Cabin. During the approach, it was very bad weather with heavy rain. He was praying to his God for his safety. Finally when the aircraft landed, he opened the emergency exit door and threw it outside. And then he came out from the aircraft and helped other passengers and crews. At last he disconnected the aircraft batteries from outside.

2 ANALYSIS

2.1 Introduction

The analysis by the investigation team has focused on the following areas:

- a) Individual/team action
- b) Weather condition
- c) Flight recorder data analysis
- d) Runway Condition
- e) Standard Operation Procedures and Crew response

2.2 Individual/Team Action

2.2.1 Flight Crew

Both the pilot-in-command (PIC) and co-pilot had operated into Yangon International Airport many times and were familiar with the runway condition and airport facilities. The PIC had (1474:45) hours on type and total flying hours (9649:20) and the co-pilot had (405:15) hours on type and total flying hours (580:40) respectively. Their licenses were valid.

2.3 Weather Condition

The METAR weather reported at Yangon International Airport on the 8th May 2019 at 18:30 was variable direction winds at 10 knots with gust of 20 knots, visibility 3000meters, thunderstorm with rain, broken clouds at 1000ft, few clouds at 8000ft, temperature 30°C, dew point 27°C and regional atmospheric pressure 1003hpa.

The METAR reported on the 8th May 2019 at 19:00 was wind speed 08knots from 30degrees, visibility 4000meters, thunderstorm with rain, broken clouds at 1200ft, few clouds at 1600ft above ground level, overcast clouds at 10000ft, temperature 30°C, dew point 27°C and regional atmospheric pressure 1004hpa.

2.4 Flight Recorder Data Analysis

Flight Data Examination: Biman Bangladesh Airlines DHC- 8-402Q, S2-AGQ

Table1: Some recorded sequence of events

Time (MST)	Airspeed (Knots)	Radio Altitude(ft)	Comment/ Remark
18:48:37	156	1723	-Aircraft was aligned with the runway at this point
18:48:52	152	1565	
18:49:01	148	1444	
18:49:47	128	777	
18:50:05	136	536	
18:50:17	131	452	- Increase in power lever angle (PLA) recorded - Ground Spoilers retracted. - Speed below target speed of 135knots
18:50:21	130	417	
18:50:23	130	410	
18:50:26	127	357	
18:50:29	134	328	
18:50:33	134	265	
18:50:36	134	213	
18:50:39	138	164	

18:50:40	140	148	
18:50:43	144	75	
18:50:46	144	52	
18:50:49	142	38	
18:50:52	150	27	
18:50:55- 18:50:57	154-149	22-14	- Greatest control column force difference recorded , with Captain applying positive force +27 lbs (nose down) while the FO applied negative force -21 lbs (nose up)
18:50:58	151	12	
18:51:07	146	0	-Main landing gear recorded as compressed for 0.5s, indicating an initial touchdown.
18:51:08	148	0	-Main landing gear recorded as uncompressed, then recorded as compressed for 0.75 s
18:51:11	148	0	- Main landing gear again recorded as compressed for 0.25s duration. - Control column forces +10 lbs (nose down) - Elevator position -2.6
18:51:12	148	1	- Control column forces nominally 0, and remain 0 for approximately 4 seconds -Elevator position moves from approximately -2.6 to -3.7 - Brake pressure increasing -Aircraft pitch angle 2degrees and increasing -Radar Altimeter begins to increase from ground level
18:51:13	148	1	-Captain applied brake pedal for 2 seconds

18:51:15	144	4	- Ground spoiler enabled -Power lever angle reduced -Control column force nominally 0 -Aircraft pitch increased to 4 degrees
18:51:16	144	8	-Captain applied brake pedal for 3 seconds
18:51:17	142	18	-Captain applied brake pedal for 2 seconds
18:51:18	140	33	- Aircraft pitch peaks at 8 degrees -Control column force Increase from 0 to +4 lbs (nose down)
18:51:19	130	44	- Propellers in beta range - Power lever angle reduced to 18 degrees
18:51:20	122	35	-Pitch change recorded from +3 to -3 degrees
18:51:21			-Impact occurs between 18:51:20 and 18:51:21

2.5 Runway Condition

The runway of Yangon International Airport was a single one with (11200ft x 200ft). The runway designation numbers were **03/21**. There were runway edge lightings, runway centerline lightings, threshold lightings, runway end lighting, precision approach lighting system on the runway 21, simple approach lighting system on the runway 03 and PAPIs on both sides. On the runway 21 was provided with Localizer and Glide slope. At the time of accident, it was raining and the runway was wet .

2.6 Operation Procedures

According to the Airplane Flight Manual (AFM), landing speed with flap 15° must be 122kt Indicated Air Speed (IAS). The pilot must maintain the airspeed and control the stabilized approach.

Generally, if a pilot determines by the time the aircraft is at the decision height (for a precision approach) or missed approach point (for a non-precision approach), that the runway or its environment is not insight, of that a safe landing cannot be accomplished for any reason, the landing approach must be discontinued (a go-around) and the missed approach procedure must be immediately initiated. It is also common for pilots to practice a missed approach as part of initial or recurrent instrument training. Unstabilized approach accounts for most approach and landing accidents. A go-around should be performed if visual references are insufficient or the airplane is not stable at 500ft above aerodrome level or below.

3 CONCLUSIONS

3.1 Findings

From the evidence available, the following findings are made. These findings should not be read as apportioning blame or liability to any particular organization or individual:

- (a) The Indicated Air Speed (IAS) approach speed between radio altitude 536ft and 12ft was 136kts, 140kts, 144kts, 150kts, 154kts and 151kts respectively which are about 20kts sometime 30kts higher than 122kts air speed as per Airplane Flight Manual (AFM). The speed targeted on the CVR does not agree with the approach speed.
- (b) While the aircraft was running parallel to the runway in four seconds, the IAS approach speed increased from 146kts to 148kts gradually which was about 26 higher than 122kts, the air speed as per Airplane Flight Manual (AFM).
- (c) While the aircraft was making approach at radio height between 14ft and 22ft, the airspeed was 149kts and 154kts respectively. At that moment the

control column force difference between Captain and First Officer was maximum values +27(Captain), and -21(First Officer).

(d) While the aircraft was running parallel to the runway, it was recorded the first instance where landing gear made contact with the surface of the runway at 146kts for 0.5 second, the second instance where landing gear made contact with the surface of the runway at 148kts for 0.75 second and the third instance where the landing gear made contact with the surface at 148kts for 0.25 second respectively. Main landing gear with the ground initially at 18:51:07 for approximately 0.5secs during which several Weight On Wheels (WOW) transitions were noted. Meanwhile control column force was approximately +10 and elevator position was -2.6. The torque developed by engine 1 and engine 2 was 25% respectively.

(e) While the aircraft was running parallel to the runway, the Captain took control of the aircraft from the first officer. At that moment the elevator position moved from approximately -2.6 to -3.7 without an input by the crew on the control column. Consequently the aircraft suddenly flew into the air and the pilot applied the brake three times at radio altitude 1ft, 8ft and 18ft respectively. At that moment the air speed was approximately 144kts which was higher 113kts, take off speed.

(f) And then the aircraft flew into the air at 140kts up to radio altitude 33ft with aircraft pitch peak at 8 degree and increased to control column force +4lb at radio altitude 44ft.

(g) The pilot put the propellers in beta range and reduced power lever angle (PLA) to 18 degrees and aircraft pitch change recorded from +3 to -3 degrees and collided with the surface of the runway 03. The activation of beta range would reduce the lift production of the wing significantly, and cause a nose down pitching moment that culminated in a collision with the runway surface.

(h) While on approach and landing phases, the pilot and copilot took turn in controlling the aircraft.

(i) It was observed in CVR that while the aircraft was on approach phase, at that time controlled by the first officer, the pilot reminded the copilot six times to go down.

3.2 Primary Cause

While the aircraft was unstablized on approach, the pilot did not execute a go-around.

4 SAFETY RECOMMENDATIONS

To reduce and eliminate of accidents and serious incidents, AAIB recommended the followings:

- (1) The pilot should execute a go-around when the aircraft was unstablized on approach and landing.
- (2) The pilot in command (PIC) should control the aircraft when the aircraft was unstablized or the weather was of adverse condition.
- (3) The flight crew should be given a training course on **Landing Performance Procedures and Speed** stated in Sub section 5.8 Airplane Flight Manual in a flight simulator to be able to perform their duties thoroughly.

Investigator -in –charge