



## **AIRCRAFT ACCIDENT INVESTIGATION BOARD**

### **FINAL AIRCRAFT ACCIDENT REPORT FOR A BOMBARDIER DASH 8 Q311, 9J – PZB THAT OCCURRED IN NAMPUNDWE, CENTRAL PROVINCE, ZAMBIA ON 25<sup>th</sup> NOVEMBER, 2019.**

Kenneth Kaunda International  
Airport  
P.O. Box 310140  
Lusaka, Zambia.  
Mobile: +260 971232741  
Tel: +260212892357

## **INTRODUCTION**

On 25<sup>th</sup> November, 2019 at about 13:20 hours local time, an accident involving a Bombardier DHC-8-311 aircraft was reported to the Director General, Civil Aviation Authority (CAA), who immediately relayed the information to the Aircraft Accident investigation Board (AAIB). The aircraft involved was a Bombardier DHC-8-311, National Registration Marks 9J-PZB, Manufacturer's Serial Number 405, belonging to Proflight Commuter Services Limited.

The interim Director Aircraft Accident Investigation Board immediately constituted an investigation team comprising 2 staff pertaining to the domains of operations and airworthiness to investigate the accident.

## **SYNOPSIS**

On November 25, 2019, a Bombardier DHC-8-311 operated by Proflight departed from Harry Mwaanga Nkumbula International Airport as a commercial flight to Kenneth Kaunda International Airport. The aircraft was descending through Nampundwe area when it entered a storm and underwent severe turbulence and damage. All passengers and crew exited the aircraft without injury but the aircraft was extensively damaged. No fire broke out. The investigation team concluded that the possible cause of the accident was due to the lack of appreciation by the cockpit crew of the Meteorological weather conditions prevailing in spite of the Meteorological aerodrome reports and forecast. Further, other possible contributory and latent factors were identified.

## TABLE OF CONTENTS

1. FACTUAL INFORMATION.....	3
1.1 History of the flight.....	3
1.2 Personnel Information.....	3
1.3 Aircraft Information .....	3
1.4 Injuries to persons .....	4
1.5 Damage to aircraft .....	4
1.6 Meteorological Information.....	5
1.7 Recorders.....	5
1.8 Wreckage and impact information.....	5
1.9 Fire .....	5
1.10 Survival Aspects .....	5
1.11 Examinations.....	5
1.12 Organisation / Management.....	5
1.13 Additional Information .....	5
2. ANALYSIS.....	6
3. CONCLUSION .....	7
4. SAFETY RECOMMENDATIONS.....	7
APPENDIX A – LABORATORY REPORTS .....	13
APPENDIX B – GLOSSARY .....	14

## **1. FACTUAL INFORMATION**

### **1.1 History of the flight**

The aircraft, operated by Proflight Zambia, departed Harry Mwaanga Nkumbula International Airport (HMNKIA) with five (5) crew and forty one (41) passengers on a routine scheduled flight to Kenneth Kaunda International Airport (KKIA).

During a routine scheduled flight from Harry Mwaanga Nkumbula International Airport enroute to Kenneth Kaunda International Airport the aircraft (9J-PZB) from the reporting point Kurma, the aircraft was met with significant weather, which made the pilots request for heading 040° to avoid it. After clearing the weather, which was indicated on the Weather Radar, they routed direct to the Non Directional Beacon 'Lima Whisky'.

On descent, they checked for weather on the radar and no heavy precipitation was showing. However, the aircraft entered the cloud and visibility was reduced significantly. Passing through Flight Level 160 at a speed of 190 nautical miles per hour, they entered a storm and there was a sudden violent shake of the aircraft; the auto pilot disengaged and the cloud turned to a very dark grey colour with heavy banging of hail on the aircraft. They immediately executed a rapid descent; the windshield cracked and the Pilot Monitoring stated that they started losing aircraft systems as in Electrics, DC Gen 1, full rudder pressure and aircraft pressurisation. They later managed to land at Kenneth Kaunda International Airport.

### **1.2 Personnel Information**

The Pilot in Command (PIC), a male has a Zambian Airline Transport Pilot Licence (ATPL), issued by the Civil Aviation Authority of Zambia. At the time of the accident he had total flight hours of 4,679.00 hours. The last medical examination for license renewal was done on 3<sup>rd</sup> May, 2019 and the license was valid at the time of the accident.

The First officer, a male holds a Zambian Airline Transport Pilot Licence (ATPL), issued by the Civil Aviation Authority of Zambia. At the time of the accident he had total flight hours of 2,963.00 hours. The last medical examination for license renewal was done on 3<sup>rd</sup> May, 2019 and the license was valid at the time of the accident.

### **1.3 Aircraft Information**

The DHC-8-311, serial number 405 is a medium Turbo prop, manufactured by Bombardier between 1997 and 2010. The cabin measures 41.5 feet long, 8.2 feet wide and 6.3 feet in height giving it a total cabin volume of 2,177.9 cubic feet. This space comfortably seats 50-56 passengers. The Bombardier Dash 8-Q311 has a maximum range of 1,063 miles and maximum speed of 330mph.

The aircraft was maintained by Proflight Zambia Aircraft Maintenance Organisation whose certificate number is Z/AMO/94/2016. The aircraft was inspected and issued with a Certificate of Airworthiness (C of A) after a Test Flight which was carried out

successfully on 11<sup>th</sup> July, 2019. The validity for the C of A was running from 15<sup>th</sup> July, 2019 to 14<sup>th</sup> July, 2020.

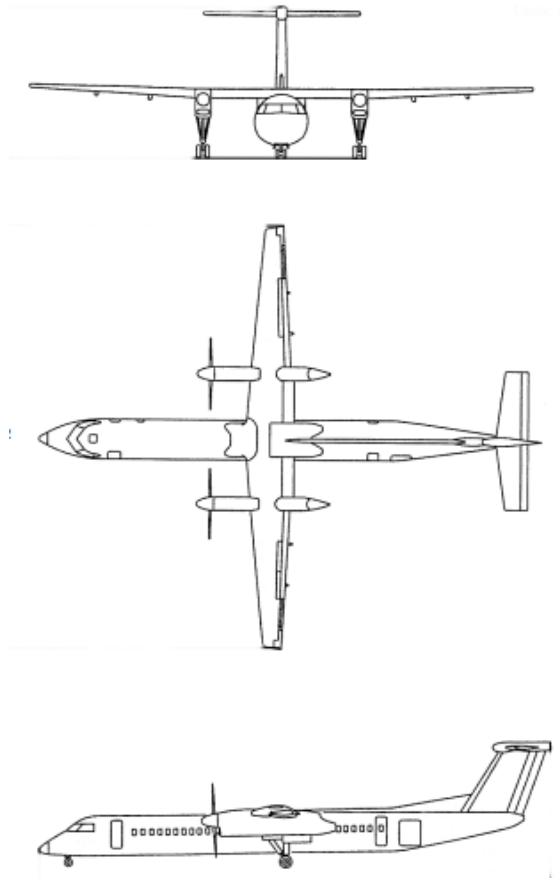


Fig.1 Bombardier Dash 8 Q311 Pictorial View

#### 1.4 Injuries to persons

The crew, passengers and others did not suffer fatal, serious nor minor injuries.

#### 1.5 Damage to aircraft

The aircraft was damaged as follows:

- Right hand Winglet tip and Navigation light was damaged. (Fig. 2)
- Radome /Nose Cone Panels were damaged (Fig. 3)
- Left Hand Leading Edge Wing Root Fairing was damaged(Fig. 4)
- Right Hand Wing Root was severely broken (Fig. 5)
- Leading Edge Horizontal Stabilizer paint was scraped off on one end
- Leading Edge Horizontal Stabilizer including the Lens Covers were damaged [Top] (Fig. 6)
- Taxi and Landing Lights were broken (Fig. 7)

## **1.6 Meteorological Information**

Few Cumulonimbus clouds, broken towering cumulus with base at 3500ft, scattered ones with base at 10,000ft, Temperature at 29°C with Dew point at 15°C and the Terminal Aerodrome Forecast (TAF) for Kenneth Kaunda International Airport was showing visibility to be greater than 10Km.

## **1.7 Recorders**

The Bombardier Dash 8 Q311 is equipped with a flight data recorder and voice recorder.

## **1.8 Wreckage and impact information**

The aircraft entered a severe storm during descent into Kenneth Kaunda International Airport. The impact of the storm damaged the following:

- a) Right hand Winglet tip and Navigation light (Fig.2)
- b) Radome /Nose Cone Panels (Fig.3)
- c) Left hand Leading Edge Wing Root Fairing (Fig.4)
- d) Right Hand Wing Root (Fig.5)
- e) Leading Edge Horizontal Stabilizer paint (Fig.6)
- f) Leading Edge Horizontal Stabilizer and Lens Covers [Top] (Fig.6)
- g) Taxi and Landing Lights (Fig.7).

For further detail reference can be made to the attached photos in Fig. 2 to Fig. 7.

## **1.9 Fire**

There was no post impact fire.

## **1.10 Survival Aspects**

All on board survived the accident without any injuries at all and safely disembarked from the aircraft.

## **1.11 Examinations**

A Damage Survey which was carried out from 29<sup>th</sup> November and 2<sup>nd</sup> December 2019 by the Structure Engineer, In-Service Engineering & Technical Support, De Havilland Aircraft of Canada Limited revealed that the aircraft was extensively damaged beyond economic repair and therefore, most of the parts needed replacing.

## **1.12 Organisation / Management**

The PIC and First Officer are employed by Proflight Zambia. The organisation is involved in Scheduled Flying business among other businesses. On the day of the accident the two pilots had not done any other flights earlier in the day; the same flight that led to the accident was their first flight of the day.

## **1.13 Additional Information**

The following is the schedule of events as reported by the Chief Air Traffic Control Officer at the time of the accident:

At 12:59hrs UTC PFZ705 got in touch with Approach Radar at position KURMA maintaining FL230.

At 13:01hrs UTC PFZ705 requested to deviate left of track due to weather and Approach Radar approved the deviation.

At 13:10hrs UTC PFZ705 requested for descent and Approach Radar descended PFZ705 to 6000ft on the QNH1015.

At 13:17hrs UTC Approach Radar cleared PFZ705 to route ATULI for the Instrument Landing System (ILS) Approach Runway 10 but in response PFZ705 requested to route LW a Non-Directional Beacon (NDB) for a visual approach. Approach cleared PFZ705 for a visual approach.

In the descent towards Right Base for Runway 10, it was noticed that PFZ705 was appearing as a Primary Target and there was no interaction with the track. This meant that the aircraft was only seen visually shortly before turning finals.

At 13:25hrs UTC PFZ705 was handed over to Tower for landing clearance. He landed safely at 13:28hrs UTC. At 13:37hrs UTC UAE713 called Tower to confirm if PFZ705 encountered some Hail Storm as the aircraft was badly damaged. Tower responded to say he was unaware.

*Note: PFZ705 did not declare any emergency with Approach Radar Control or Tower.*

## **2. ANALYSIS**

The fact that PFZ705 requested to deviate left of track was evident of significant weather activity enroute especially with meteorological information having been given as few Cumulonimbus clouds, broken towering cumulus with base at 3500ft, Scattered ones with base at 10,000ft, Temperature at 29°C with Dew point at 15°C.

A Cumulonimbus cloud is associated with extreme weather such as heavy torrential downpours, hail storms and lightning. Due to its size and towering appearance, it can be identified from a long distance and is to be avoided at all costs.

The extent of the damage to the aircraft could have only come from the impact of a hail storm and lightning only associated with a Cumulonimbus cloud.

The fact that PFZ705 was cleared by Approach Radar to route via ATULI for an ILS approach but chose rather to route directly to LW for a visual approach and then ending up in the middle of a thunderstorm shows that PFZ705 did not have the runway in sight when they requested for a visual approach.

The preceding flight from Lusaka into Livingstone was delayed for about 2 hours causing pressure on the crew to try and catch up with time since, the same Dash 8-Q311 aircraft; registration 9J-PZB was scheduled to undertake a flight into Ndola at 15:30hrs UTC.

The flight PFZ705 did not declare any emergency with Approach Radar Control or Tower.

### 3. CONCLUSION

Cumulonimbus cloud (CB) is associated with extreme weather such as heavy torrential downpours, hail storms and lightning. Due to its size and towering appearance, it is very significant and can be identified from a long distance and is to be avoided at all costs.

The Cumulonimbus storm cell that caused the above mentioned damage to the aircraft should have been identified and avoided from a long distance in the same manner the enroute weather was avoided. Even with the Weather Radar being unserviceable or not performing satisfactorily, a CB is visually identified from a long distance.

The cause(s) of the accident is attributed to:-

- a) Lack of appreciation by the cockpit crew of the Meteorological weather conditions prevailing in spite of the Meteorological aerodrome reports and forecast to the end that, the flight was routed directly into the Cumulonimbus storm rather than away from it.
- b) Commercial pressure could have contributed due to the 2 hours plus technical delay; the pilots chose a direct route which took the flight into the storm rather than to circumnavigate away from the storm.
- c) The pilot exhibited lack of good airmanship and judgment by failing to report the encounter of heavy turbulence to Air Traffic Control. This should have been done to contribute to the safety of flights from other aircraft by reporting the time, location and intensity of the encounter.

### 4. SAFETY RECOMMENDATIONS

It is hereby highly recommended that **serious consideration be urgently** given to;

#### 4.1 Proflight Zambia

AAIB/SR/2022/028

Proflight Zambia management is recommended to be conducting in-house ground refresher training on bad weather operations before the rainy season and any other challenging season commences.

AAIB/SR/2022/029

Proflight Zambia management is recommended to be conduct regular refresher training on 'Duties and Responsibilities' of the Pilot in Command with regard to Company Procedures and Zambia Civil Aviation Requirements.

AAIB/SR/2022/030

Proflight Zambia management is recommended to prioritise aviation safety over commercial interests.



## **4.2 The Civil Aviation Authority**

AAIB/SR/2022/031

The Civil Aviation Authority is recommended to carry out an ad-hoc audit of Proflight Zambia aviation safety and quality control measures to ensure that management conducts regular Pilot refresher training in (bad weather operations) and 'Duties and Responsibilities' of the Pilot in Command as set by their company procedure and Zambia Civil Aviation Requirements.



**RIGHT HAND  
WINGLET TIP AND  
NAVIGATION  
LIGHT DAMAGED**

Fig. 2 Right Hand Winglet Tip and Navigation Light



**RADOME / NOSE CONE  
PANELS DAMAGED**

Fig. 3 Radome /Nose Cone Panels



Fig .4 Left Leading Edge Wing Root Fairing



Fig. 5 Right Hand Wing Root

LEADING EDGE HORIZONTAL  
STABILIZER INCLUDING THE  
LENS COVERS WERE DAMAGED  
(TOP)



Fig. 6 Leading Edge Horizontal Stabilizer and Lens Covers



Fig.7 Taxi and Landing Lights

## **APPENDIX A – LABORATORY REPORTS**

Damage Survey report is available upon request from the Aircraft Accident Investigation Board.

## **APPENDIX B – GLOSSARY**

AAIB – Aircraft Accident Investigation Board  
AOC – Air Operator Certificate  
ATPL – Airline Transport Pilot Licence  
CAA – Zambia Civil Aviation Authority  
CATCO – Chief Air Traffic Control Officer  
CAVOK – Ceiling and Visibility OK  
CPL – Commercial Pilot Licence  
Ft – Feet  
Ft/m – Feet per minute  
HMNIA – Harry Mwaanga Nkumbula International Airport  
Hrs – hours  
IAS – Indicated Air Speed  
Kg – Kilograms  
Kts – Knots  
Lb – Pounds  
M – Meters  
MTOW – Maximum Take-off Weight  
NM – Nautical Miles  
PIC – Pilot in Command  
SATCO – Senior Air Traffic Control Officer  
TAF – Terminal Aerodrome Forecast  
UTC – Universal Time Coordinated  
VFR – Visual Flight Rules  
ZACL – Zambia Airports Corporation Limited