

بِسْمِ اللّٰهِ الرَّحْمٰنِ الرَّحِیْمِ



AIRCRAFT ACCIDENT REPORT 2017/03

**PRELIMINARY REPORT ON INVESTIGATION OF THE  
ACCIDENT OCCURRED ON VIKING AIR DHC-6-200,  
8Q-IAG AIRCRAFT AT DHOORES FLOATING  
PLATFORM, MALDIVES**

**on 16th November 2017**

**Operator:** Island Aviation Services Ltd.  
**Manufacturer:** Viking Air  
**Model:** DHC-6-200 (Floatplane)

## INTRODUCTION

Maldives is a signatory to the Convention on International Civil Aviation (Chicago, 1944) which established the principles and arrangements for the safe and orderly development of international air transport. Article 26 of the Convention obligates Signatories to investigate accidents to civil aircraft occurring in their State.

The report is based upon the investigation carried out to date by the Accident Investigation Coordinating Committee (AICC) in accordance with Annex 13 to the Convention, the Civil Aviation Act 2/2001 and the Civil Aviation Regulations. The sole objective of this investigation is to prevent accidents and serious incidents. It is not the purpose of this investigation to apportion blame or liability as envisaged in Annex 13 to the Convention.

In this investigation, AICC was assisted by the Maldives Civil Aviation Authority (MCAA), Island Aviation Services Limited, the Maldives National Defense Force and the Maldives Police Service.

All times in this report are in local time unless otherwise stated. Time difference between local and UTC is +5 hours.

The report is released on 7<sup>th</sup> March 2018.

Mr. Abdul Razzak Idris  
Chairperson

Accident Investigation Coordinating Committee



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## List of abbreviation

<b>AICC</b>	: Accident Investigation Coordinating Committee
<b>ARFF</b>	: Airport Rescue & Fire Fighting
<b>COM</b>	: Communication
<b>CVR</b>	: Cockpit Voice Recorder
<b>DHC-6-300</b>	: Viking Air Twin Otter 300 Series
<b>DOR</b>	: Aavee Nature's Paradise Island (Dhoores Island)
<b>FDR</b>	: Flight Data Recorder
<b>FT</b>	: Feet
<b>IASL</b>	: Island Aviation Services Limited
<b>Kts</b>	: Knots
<b>KMA</b>	: Kandinma Maldives
<b>Lbs</b>	: Pounds
<b>LT</b>	: Local time
<b>MCAA</b>	: Maldives Civil Aviation Authority
<b>MCAR</b>	: Maldives Civil Aviation Regulations
<b>MLE</b>	: Male'
<b>MLF</b>	: Maalifushi
<b>MNDF</b>	: Maldives National Defence Force
<b>MPS</b>	: Maldives Police Service
<b>NIY</b>	: Niyaama Private Island
<b>NM</b>	: Nautical Mile
<b>PF</b>	: Pilot Flying
<b>PIC</b>	: Pilot in command
<b>PNF</b>	: Pilot Not Flying
<b>RWY</b>	: Runway
<b>TBA</b>	: To be assessed
<b>TBD</b>	: To be determined
<b>UTC</b>	: Universal Coordinated Time
<b>VFR</b>	: Visual Flight Rules
<b>VHF</b>	: Very High Frequency

## Synopsis

Flight Q27100, a Viking Air (De Havilland) DHC-6-200 aircraft with registration marks 8Q-IAG, suffered an accident during the take-off roll from "AAVEEEE Nature's Paradise Island" on Dhoores Island (DOR) at 0926 hrs on 16 November 2017. The aircraft was flying under visual flight rules (VFR) on a commercial flight, carrying 12 passengers to Male' (MLE).

At the time of the accident, the weather at the departure point was bad. The aircraft was on take-off roll accelerating when it struck a sea swell and bounced and struck hard on the second swell and continued to strike a third swell. On striking the second swell the crew felt that the right float got detached and on striking the third swell the crew realized that the left float also got detached pushing the aircraft nose into water. The propellers struck the floats cutting into them, damaging the propellers, and stopping the engines. The detached floats were trapped under the wings keeping the aircraft afloat with the nose immersed in water. Water then started rushing into the aircraft.

All 12 passengers and three crew were able to evacuate the aircraft without physical injury. Passenger bags were removed. The aircraft was towed and secured at the floating platform.

The accident was notified to the Aircraft Accident Investigation Committee (AICC) at 0945 hrs. Three Inspectors arrived at the scene at 1515 hrs. and the investigation commenced.

Legal Owner	Gravitas Aviation Ltd,
Registered Owner	Island Aviation Services Ltd.
Operator	Island Aviation Services Ltd.
Aircraft Type	Viking Air (De Havilland) DHC-6-200
Nationality	Maldivian
Registration	8Q-IAG
Manufacturer's Serial Number	226
Place of Accident	Dhoores (DOR) floating platform Latitude: 05° 31.115' N Longitude: 73° 28.971' E
Date and Time	16 November 2017 at 0945 hrs

## **I Factual information**

### **I.1 History of the flight**

#### **1.1.1 Background**

The aircraft 8Q-IAG was scheduled to make 4 sectors on the accident flight. No defects were reported on these flights and the aircraft had no open deferred defects.

The flight, MLE-MLF-KMA-DOR-MLE was released with 3 crew members (2 flight crew and 1 cabin crew) and 7 passengers from MLE-MLF. As per the flight release document, the aircraft was loaded with 265 lbs of baggage and 1,600 lbs of fuel, with a take-off mass of 11,665 lbs.

The crew carried out the pre-flight and walk-around checks prior to the first flight of the day. No abnormalities were reported or recorded by the pilots.

The company usually schedules a sequence of flight sectors back to back and issues a combined "flight release" for these flight sectors.

The PIC was PF for the sector MLE-MLF, First Officer was PF for the sector MLF-KMA, and the KMA-DOR sector was flown by the PIC. According to the crew, taxi-out, take-off, cruise and the landing on all sectors were normal until the aircraft struck the swells during the take-off run at DOR. The landing at DOR was carried out crosswind, parallel to the swell patterns.

The aircraft cast off from the floating platform of DOR with the same crew members and 12 passengers. The PIC gave control to the first officer to taxi the flight from DOR as he was the PF for the sector. As the sea conditions were bad, both pilots discussed the best path to take-off and chose the best possible direction taking the swell patterns into consideration. According to the PIC, this path was chosen because the swell effect is

usually less prominent near the island right throughout. On take-off run the aircraft struck a swell which was more like a small bump, the first officer continued the take-off run when it struck the second swell on the right float. On striking the second swell the crew felt that the right float got detached. The aircraft bounced again and came down on the third swell, partially detaching the left float as well. The pilots tried to adjust the speed on every bounce by lowering the nose primarily to ride the swells and avoid heavy impact on the next swell. On impacting the third swell, with the floats already detached, the propellers cut into the floats before the aircraft came to a stop. The PIC carried out the engine shutdown procedures and gave the command to evacuate. By this time the cabin crew already had initiated the evacuation process. The first officer then opened the left cabin emergency door and helped the passengers in the evacuation.

The standby dhoni came to the aircraft soon after the crash. The passengers were in the water wearing the life jackets on. A dinghy boat came near the aircraft within approximately 2 minutes of the crash. The six passengers who escaped out from the left hand emergency exit were taken on board the dinghy boat. The remaining six passengers were taken on board the standby dhoni from the right side. All the passengers were taken to the resort safely.

#### 1.1.2 Flight crew

The accident flight was the third flight of the day for both the commander and the first officer.

The PIC and the co-pilot have been flying DHC-6 aircraft on floats for more than 7 years. The crew reported to duty at IASL base at 0615 hours. As per the day's schedule, they were assigned the following flight(s);

- MLE – MLF – KMA – DOR – MLE.
- MLE - NIY – MLE
- MLE – W Maldives - MLE

#### 1.1.2 Loading

Aircraft load – Maximum Take Off Weight: 12,500 lbs.

DOR-MLE Take Off Weight: 12,008 lbs.

The load sheet served as the passenger manifest. A copy of the load sheet was retained with dispatch before take-off as required per the company Operations Manual.

Baggage in the passenger compartment was secured using a belt. The cabin crew reported baggage came lose during the impact and some bags fell on his head while some fell on his feet.

There is no mechanism to secure baggage in the aft compartment, however a bulkhead separates the aft baggage compartment from the passenger compartment. This aft baggage compartment was not used in the accident flight.

## 1.2 Injuries to persons

Injuries	Crew	Passengers	Others
Fatal	-	-	-
Serious	-	-	-
Minor/None	3	12	-

## 1.3 Damage to aircraft

The aircraft was substantially damaged.

## 1.4 Other damage

NIL

## 1.5 Personnel information

### 1.5.1 Commander

Age:	34 years
Licence:	MV.FCL.ATPL 698
Aircraft Ratings:	DHC-6 / IR
Last proficiency check:	LPC (21.06.2017)
Last instrument rating renewal:	21.06.2017
Last line check:	25.07.2017
Last medical:	06.09.2017 (Class 1)
Flying experience:	Total all types: 5,899.15 hrs
	On Type: 5,599.10 hrs
	Last 90 days: 129.10 hrs
	Last 28 days: 75.25 hrs
	Last 24 hours: 0 hrs
Previous rest period:	14 <sup>th</sup> & 15 <sup>th</sup> November 2017 (58 hrs)

### 1.5.1 Co-pilot

Age:	43 years
Licence:	MV.FCL.ATPL 718
Aircraft Ratings:	DHC-6 / IR
Last proficiency check:	LPC (13.05.2017)
Last instrument rating renewal:	31.05.2017
Last line check:	03.06.2017
Last medical:	19.03.2017 (Class 1)



Flying experience: Total all types: 4,974.20 hrs  
On Type: 4,705.00 hrs  
Last 90 days: 124.30 hrs  
Last 28 days: 63.20 hrs  
Last 24 hours: 4.20 hrs  
Previous rest period: 10<sup>th</sup> & 11<sup>th</sup> November 2017 (58 hrs)

#### 1.5.1 Cabin crew

Age: 30 years  
Licence: CCL 925  
Last recurrent training: 11.10.2017  
Last medical: 02.06.2016 (Class 3)  
Previous rest period: 14<sup>th</sup> & 15<sup>th</sup> November 2017 (58 hrs)

### 1.6 Aircraft information

#### 1.6.1 General information

The DHC-6-200 "Twin Otter" is an unpressurised, all-metal, high wing aircraft powered by two Pratt & Whitney PT6A-20 engines driving Hartzell three-blade, reversible-pitch, full feathering propellers. However, this aircraft was modified to increase the MTOW to 12,500 lbs by installation of a 300 series wing and engines (PT6A-27) under FAA STC No. SA02252LA

Manufacturer: Viking Air (De Havilland)  
Registration: 8Q-IAG  
Powerplants: 2 x Pratt & Whitney PT6A-27 turboprop engines  
Manufacturer's serial number: 226  
Year of construction: 1969  
Airframe hours at time of accident: 42,772.38 hrs  
Certificate of Airworthiness: Normal category, issued on 19 March 2015  
Airworthiness Review: Renewed on 2 June 2017  
Certificate:

#### 1.6.2 Cabin layout and configuration

The aircraft was in float configuration with Wipaire 13000S floats. The cabin was configured for 15 passengers. Baggage is placed near the right rear passenger door or the aft baggage compartment. The aircraft has two main exits and two emergency exits in the cabin and two exits in the cockpit. The right rear passenger exit is usually blocked with baggage. The right rear passenger exit and the left emergency exit were used for evacuation on the accident flight.

### 1.6.3 Recent maintenance

The last scheduled maintenance check was Equal Maintenance for Maximum Availability (EMMA) number 40 carried on 28 October 2017 (at 42,694.01 TAT and 75,624 TAC). A scheduled left-hand propeller replacement was carried out on 22 June 2015. Five unscheduled defects were reported in the 30 days prior to the accident. These were;

1. Inability to transmit on any frequency,
2. Rudder lock not locking,
3. Torque fluctuations on three separate occasions,
4. A broken exit window,
5. A forward fuel gauge reset error.

The last engine wash was done on 15<sup>th</sup> November 2017. The last aircraft maintenance release was after the daily check on 15<sup>th</sup> November 2017.

The aircraft had no open deferred defects at the time of the accident or any other reported defects on the day of the accident.

### 1.6.4 Flight controls

The flight controls consist of conventional, manually actuated primary flight controls operated through cables, pulleys, and mechanical linkages. Rudder and elevator trim are manually controlled and mechanically actuated; aileron trim is electrically actuated. Secondary flight controls consist of hydraulically actuated wing flaps. A stall warning system provides warning of impending stall.

### 1.6.7 Weight and balance

The aircraft was last weighed on 11<sup>th</sup> November 2014 by IKHANA. The weight and balance was then adjusted to account for changes related to conversion into float configuration. The basic data was then converted into Index format for use by flight operations.

#### Limitations

Maximum Take-Off Mass:	12,500 lb
Unladen centre of gravity Station:	214.61 inches of datum
Unladen centre of gravity position:	Y% of MAC
Unladen Index:	13.74
Centre of Gravity Limits:	Forward 207.74 inches (25% of MAC) Aft 213.20 inches (32% of MAC)

## **1.7 Meteorological information**

There is no weather station in Dhaalu Atoll and hence this information cannot be provided. Crew indicated they usually do flyovers to ascertain conditions at the landing area and the same was done at DOR before landing.

## **1.8 Aids to navigation**

The aircraft was operating under visual flight rules. Navigation was not a factor in this accident.

## **1.9 Communications**

The aircraft was equipped with two VHF sets both of which were serviceable at the time of departure. The pilots did not report a communication problem.

## **1.10 Aerodrome and approved facilities**

Dhoores water aerodrome is uncontrolled equipped with one floating platform that is switched to two different locations depending on the monsoon. The platform is located at N02°54'56.6"E072°52'53.0" (N/E monsoon) and N02°55'7.7"E072°53'9.4" (S/W monsoon). The floating platform was approved on 20 January 2016. The last inspection date was 11 January 2016.

## **1.11 Flight Recorders**

The aircraft was not equipped with a flight data recorder (FDR) or cockpit voice recorder (CVR).

## **1.12 Wreckage and impact information**

The accident occurred in the open water off DOR, located in Dhaalu Atoll, Maldives.

The aircraft was afloat with both floats detached. The detached floats were trapped under the wings keeping the aircraft afloat with the nose immersed in water.

The wreckage was salvaged and brought near the DOR shore on the same day and it was brought to Velana International Airport on the following day. The salvage operation was jointly accomplished by MNDF and IASL personnel, overseen by the investigators.

A team of MCAA inspectors, MPS, MNDF and staff of DOR were deployed on the accident site soon after the accident occurred to assist AICC in the investigation.

### **1.13 Medical and pathological information**

The crew did not have any pre-existing medical conditions that may have contributed to the accident. Medical examinations were performed on all crew members and there was no evidence of alcohol, drugs or any toxic substance usage that may have contributed to the accident.

### **1.14 Fire**

There was no evidence of fire throughout the flight or on impact.

### **1.15 Survival aspects**

The accident took place near the DOR, therefore no search was required.

The cabin crew initiated the evacuation process assisted by the flight crew.

The standby dhoni came to the aircraft soon after the crash. The passengers were in the water wearing the life jackets on. A dinghy boat came near the aircraft within approximately 2 minutes of the crash. The six passengers who escaped out from the left hand emergency exit were taken on board the dinghy boat. The remaining six passengers were taken on board the standby dhoni from the right side. All the passengers were taken to the resort safely.

ELT was activated and appropriate COSPAS SARSAT messages were received.

Cabin attendant, PIC and First Officer collectively initiated evacuation of the occupants immediately after the crash. Emergency exits of the aircraft were used for evacuation. It took less than a minute to evacuate all the passengers from the aircraft. The cabin attendant faced difficulties to open the rear right main exit door as the baggage came loose on impact and the baggage lay on the floor impeding the evacuation.

### **1.16 Tests and research**

TBA

### **1.17 Organisational and management information**

Island Aviation Services Ltd (IASL) is a Maldives Civil Aviation Authority (MCAA) approved Air Operator. IASL provides international and domestic air services with a fleet of A320/321, DHC-8 and DHC-6 float aircraft. The company is authorized to conduct scheduled IFR and non-scheduled day VFR Operations.

Regular inspections and periodical flight checks were conducted on the operation and crew by the MCAA to verify compliance and competency. The company also holds an Aircraft

Maintenance Organisation Approval. Annual audits with random spot checks and regular Airworthiness Review Inspections were carried out by the MCAA.

### **1.18 Additional information**

AICC investigation team analyzed the evidence available. All flight crew, some passengers involved in this accident and key eyewitnesses were interviewed by the investigators.

### **1.19 Useful or effective investigation techniques**

[Not applicable]

## **2 Analysis (Reserved)**

## **3 Conclusion (Reserved)**

## **4 Recommendation (Reserved)**

Report compiled by:

Accident Investigation Coordinating Committee

Date: 7<sup>th</sup> March 2018