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AIR ACCIDENT INVESTIGATION DEPARTMENT

FINAL SERIOUS INCIDENT REPORT 5Y-VVY 08.01.2013

CIVIL AIRCRAFT SERIOUS INCIDENT REPORT

CAV/INCID/VVY/13

OPERATOR : BLUEBIRD AVIATION LIMITED

OWNER : BLUEBIRD AVIATION LIMITED

MANUFACTURER : BOMBARDIER AEROSPACE INC.

AIRCRAFT MODEL : DHC-8-402

REGISTRATION : 5Y-VVY

PLACE : HKNW (WILSON AIRPORT, KENYA)

COORDINATES : 01°19'18"S 36°48'54"E

DATE : 08 JANUARY 2013

TIME : 0349 HOURS

All times given in this report are Coordinated Universal Time (UTC)

East African Local Time is UTC plus 3 hours.

OBJECTIVE

This report contains factual information which has been determined up to the time of publication. The information in this report is published to inform the aviation industry and the public of the general circumstances of accidents, serious incidents and incidents.

This investigation has been carried out in accordance with *The Kenya Civil Aviation (Aircraft Accident and Incident Investigation) Regulations, 2013 and Annex 13 to the ICAO Convention on International Civil Aviation.*

The objective of the investigation of an accident or incident under these Regulations shall be the prevention of accidents and incidents. It shall not be the purpose of such an investigation to apportion blame or liability.

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ABBREVIATIONS

AAID	-	Air Accident Investigation Department
AMSL	-	Above Mean Sea Level
ATC	-	Air Traffic Control
ATPL	-	Airline Transport Pilot's License
CPL	-	Commercial Pilot Licence
FL	-	Flight Level
FO	-	First Officer
HKNW	-	ICAO Aerodrome Designation for Wilson Airport
ICAO	-	International Civil Aviation Organization
ITT	-	Inter-Turbine Temperature
JKIA	-	Jomo Kenyatta International Airport
KCAA	-	Kenya Civil Aviation Authority
METARs	-	Meteorology Aerodrome Routine Weather Reports
MLG	-	Main Landing Gear
SOP's	-	Standard Operating Procedures

SYNOPSIS

On 08 January 2013, at approximately 0400 hours, the Air Accident Investigation Department (AAID) was notified of a serious incident by the Wilson Airport (HKNW) Air Traffic Control (ATC). Investigators reported on site within one hour of notification.

At 0349 hours on 08 January 2013, a DHC-8-402 aircraft of registration 5Y-VVY overran runway 14 during an aborted takeoff. The aircraft was conducting a scheduled cargo flight from Nairobi Wilson Airport to Mogadishu Main Airport with three persons on board.

There were no injuries reported as a result of the incident. The aircraft sustained minor damage on its nose and main landing gear tyres.

The probable cause of the incident was determined to be failure of flight crew to execute maximum continuous braking action during a rejected takeoff before V_1 . The key contributory factor was concentration of the flight crew on steering the aircraft back to the runway centerline after it veered to the right.

1. FACTUAL INFORMATION

1.1. History of Flight

On 8 January 2013, a DHC-8-402 aircraft of registration 5Y-VVY which was being operated by Bluebird Aviation Limited was conducting a routine Commercial Air Transport (Cargo) flight from Nairobi Wilson Airport to Mogadishu Main Airport in Somalia. According to the Captain of the aircraft, the company operations into Somalia are repetitive in nature. They follow the same route and fly the same aircraft. The aircraft cargo was weighed and loaded at approximately 0030 hours. According to the Captain, there was a considerable amount of cargo in the aircraft. The aircraft was loaded with 8 tonnes of cargo.

The Captain reported on duty at 0245 hours on 8 January 2013. He visited the company Operations Office to verify the aircraft load sheet, weather reports, NOTAMs and to receive briefings prior to the flight. At approximately 0300 hours, the Captain conducted his Preflight Checks at the company base at Wilson Airport, where the aircraft had been parked overnight. There were no noted deficiencies on the aircraft. The aircraft was then refueled under the supervision of the Captain. The total amount of fuel in the fuel tanks after refueling was approximately 4.5 tonnes. The Captain initiated engine start-up at approximately 0325 hours.

At 0335, 5Y-VVY flight crew contacted Wilson Ground Control requesting for engine start-up and taxi for a flight to Mogadishu. Start-up and taxi was approved for flight level FL 230. There were three persons on board and the aircraft had an endurance of five hours. According to the crew, engine ground runs were conducted before taxi and all indications were normal. The aircraft was cleared for taxi via Taxiway C to the holding point of runway 14. The Captain was taxiing the aircraft while the First Officer (FO) made communications with ATC. According to the Captain, the FO was to fly the aircraft for the first leg to Mogadishu. At 0342, the aircraft was handed over to Wilson Tower as it lined up for take-off on runway 14.

At 0344, the ATC Tower cleared the aircraft for departure on runway 14, FL 230 via UTA Boundary and to set course Alpha Lima. Shortly before departure at 0346, ATC Tower revised its initial clearance. 5Y-VVY was re-cleared to turn left on a heading of 050 after take-off runway 14. This, according to the Captain, was going to be a challenging maneuver with an acute left turn and immediate level off after takeoff. The Captain, therefore, decided he will handle this maneuver himself and became the pilot flying during takeoff. According to the Captain, the change in clearance was attributed to lots of aircraft landing at JKIA runway 06 at the time. To maintain the initial clearance, 5Y-VVY would have had to wait until all the aircraft that had lined up for landing at JKIA landed.

The aircraft was configured for takeoff with flaps set at 15°. At 0347, 5Y-VVY was cleared for takeoff. During the takeoff roll, the FO called out speeds of 80 knots. At this point, the Captain checked the aircraft parameters and all the indications were normal but still changing. A few seconds later, the Captain took another look at the parameters and noticed an abnormal engine indication on engine number 1. The ITT gauge for the left engine was indicating temperatures going to the red range which is between 840°C and 880°C. The Captain then decided to abort the takeoff. According to the Captain, the aircraft at this point was rolling at a speed of approximately 105 knots and had just crossed the intersection of runway 07. The Captain immediately retarded the engine power and initiated braking action. The aircraft initially experienced a directional problem and could not maintain its motion on the runway centerline. It veered to the right side of the runway as the pilot tried to slow it down. The Captain temporarily released the brakes as he steered the aircraft back to the runway centerline. According to the captain, he resumed braking after the aircraft was steady and close to the runway centerline. The aircraft overran the runway and came to rest 67 meters from the threshold of runway 32.

At 0348, 5Y-VVY radioed Wilson Tower stating that they had overshot the runway after a rejected takeoff. The Tower cleared the aircraft to make a

180° turn and backtrack runway 14. However, the aircraft could not move and had to be towed.

1.2. Injuries to Persons

Injuries	Crew	Passengers	Others
Fatal	-	-	-
Serious	-	-	-
None	3	-	

1.3. Damage to Aircraft

The aircraft sustained minor visible damage on its nose and main landing gear tyres.

1.4. Other damage

One unit of the approach lights for runway 32 was damaged as the aircraft overran the runway.

1.5. Pilot Information

1.5.1. Captain

The Captain was a Ugandan national aged 37 at the time of incident. The Captain held a valid Airline Transport Pilot's Licence Number YK-4724-AL issued on 30 October 2002 by the Kenya Civil Aviation Authority (KCAA). The ATPL was valid until 19 December 2013. He also held a valid instrument rating issued on 08 December 2012. The pilot had a class one medical certificate issued on 8 December 2012 and was valid at the time of incident. The Captain also held a Flight Radio Telephony Operator's Licence issued by KCAA which was valid until 24 May 2013.

The Captain also held type ratings for DHC-8, Fokker 28, Fokker 50, ATR 42, Let 410 UVP-E9 and Cessna 208 aircraft types. The DHC-8 type rating was endorsed on the Captain's License on 8 December 2012.

According to documents provided by the operator, the Captain underwent his last proficiency check on the DHC-8 aircraft on 13 December 2012 and his performance was rated above average.

A summary of the Captain's relevant information is indicated in the table below.

Date of Birth/Age	10 December 1975
Sex	Male
Nationality	Uganda
License No.	YK-4724-AL
Type of License	ATPL (Aeroplanes)
Validity of license	Valid until 19 December 2013
Ratings	DHC-8, F28, C208, Let 410 UVP-E9, ATR 42, FK 50.
Proficiency check	13 December 2012
Total Flying Hours	10701
Total hours as PIC	6278
Total hours on type	4063
Total time (hrs) in the last 90 days	288
Total time (hrs) in the last 30 days	97.1
Total time (hrs) in the last 7 days	28.5
Total time (hrs) in the last 24 hours	7.7
Duty time	08/01/2013: 1 hour 07/01/2012: 6 hours 06/10/2012: 6 hours
Medical Certificate (Class/Valid Date)	Class 1 Medical Certificate. Examined on 08/12/2012

1.5.2. First Officer

At the time of incident, the FO was on his second year working at Bluebird Aviation. He received his initial flight training between 2009 and 2010. Thereafter, he did an instructor's course and joined Bluebird Aviation towards the end of 2010. The FO held a valid Commercial Pilot's Licence (CPL) Number YK-6723-CL issued by KCAA. The CPL was valid until 24 March 2013.

The FO had been trained on the DHC-8 and Fokker 50 aircraft types. He flew these aircraft types routinely.

According to records provided by the operator, the FO underwent a flying proficiency check on 17 October 2012 and a route proficiency check on 18 October 2012. He was rated satisfactory in both cases.

A summary of the Captain's relevant information is indicated in the table below.

Sex	Male
Nationality	Kenya
License No.	YK-6723-CL
Type of License	CPL (Aeroplanes)
Validity of license	Valid until 24 March 2013
Proficiency check	17 October 2012
Total Flying Hours	2404.3
Total hours as PIC	130.5
Total hours on type	958.4
Total time (hrs) in the last 90 days	226.8
Total time (hrs) in the last 30 days	60.4
Total time (hrs) in the last 7 days	22.9
Total time (hrs) in the last 24 hours	7.2

1.6. Aircraft Information

1.6.1. General Aircraft Details

Manufacturer	Bombardier Aerospace Inc.
Model	DHC-8-402
Serial Number	4009
Registration	5Y-VVY
Date of Manufacture	06 December 2000

Category	Commercial Air Transport
Number and type of engines	2 Pratt & Whitney PW 150A
Total Airframe hours (as at 09 October 2012)	13,611.6
Total Cycles (as at 09 October 2012)	15,142

The aircraft was Kenyan registered with a certificate of registration number 2253 issued on 19 April 2010 by KCAA. At the time of incident, the aircraft held a Certificate of Airworthiness issued by KCAA which was valid until 03 June 2013.

The aircraft was equipped with two Pratt & Whitney PW 150A turboprop engines. According to documents provided by the operator, the Time Since New for the left engine was 14,088 hours and the Cycles Since New were 15,058. The right engine had 944.2 hours since new and a total of 650 cycles.

1.6.2. Braking System

The aircraft was equipped with carbon braking system. The braking system was operationally tested after the incident and found satisfactory.

1.6.3. Engine Trend Monitoring

The aircraft was equipped with an engine trend monitoring equipment. The operator provided records of the left engine trend monitoring from October to December 2012. Over this duration the ITT for the left engine was relatively stable at approximately 740°C. The highest ITT of approximately 770°C during this period was recorded on 13 December 2012.

1.7. Meteorological Information

Weather information was available to the crew from the Wilson Airport Meteorological Office and ATC Tower. Official Meteorology Aerodrome Routine Weather Reports (METARs) for HKNW were issued on hourly basis.

The 0300 hours METAR for HKNW on 08 January 2012 indicated that the wind was calm and visibility was better than 10 km. Clouds were broken at 1800 ft. The outside temperature was 18°C, dew point was 16°C, and QNH was 1021hPa.

1.8. Communications

The pilots were in regular radio communication with ATC from the time of engine start-up and taxi from up to the time of the incident. No communication problems reported during the time of occurrence. A complete recording of the radio transmissions between the aircraft and ATC was available for the investigation.

1.9. Aerodrome Information

Wilson Airport (ICAO designation HKNW) is located five kilometers south of Nairobi and serves both domestic and international traffic. It is located at latitude 01° 19' 18.19" S and longitude 036° 48' 53.40" E at an elevation of 5546 feet AMSL. The aerodrome operating hours are from 0330 to 1730. The airport has four asphalt runways 07/25 (4800×79 ft), 14/32 (5118×75 ft). The airport is also equipped with Air Traffic Control facilities and Fire and Rescue Services.

1.10. Wreckage and Impact Information

The aircraft remained intact with minor tyre damage during this incident. It overran runway 14 by approximately 67 meters from the threshold of runway 32. Tyre marks of braking action on the runway were visible after the intersection of runways 07 and 14 and just before the end of runway 14. The tyre marks indicated an aircraft motion from the right hand of the runway centerline towards the centre.



2. ANALYSIS

The Captain reported conducting engine ground runs prior to taxi and according to him both engines were operating normally. The initial intent was for the FO to be the pilot flying from Wilson to Mogadishu. However, due to the change in clearance from ATC which would require an acute left turn immediately after takeoff, the Captain decided to conduct the take off himself.

The Captain rejected takeoff as per Standard Operating Procedures (SOPs) when he noticed an abnormal engine indication of high ITT before the V_1 speed. After retarding power on both engines, the aircraft veered to the right hand side of the runway centerline. It was considered that this was possibly as a result of one engine reacting faster than the other or the brakes on the right MLG were more effective than those on the left MLG. The Captain released the brakes to concentrate on steering the aircraft to the runway centerline. He resumed braking again once the aircraft was steady and close to the centerline. Therefore, there was no continuous maximum braking action from the flight crew after the decision to reject the takeoff was made.

The decision to reject the takeoff was made when the aircraft had attained a speed to approximately 105 knots and after crossing the intersection of runways 14 and 07. The remaining runway length available to stop the aircraft was approximately 500 meters. Apart from the braking action which was not continuous, no other speed reducing devices were employed by the crew to stop the aircraft. The flight crew concentration during the rejected takeoff temporarily shifted to steering the aircraft which had veered to the right back to the centerline. In addition, the aircraft was loaded with 8 tonnes of cargo and therefore had substantial momentum at 105 knots. All these factors contributed to the crew not being able to stop the aircraft within the runway length.

The pilots held valid licenses and qualifications for the flight. The Captain was rated on the aircraft and had over 4000 hours on type. He had also received simulator training on aborted takeoff on August 2012. The flight

crew qualifications and experience were considered sufficient for the flight and were not a factor in this investigation.

Dry weather conditions that prevailed at the time of incident did not have a negative effect on the braking effectiveness of the aircraft.

The cause of the high left engine ITT was not established during this investigation.

3. CONCLUSIONS

3.1. Findings

1. The pilots held appropriate qualifications and experience for the flight.
2. The braking action by the flight crew after initiating the rejected takeoff was not maximum continuous.
3. The flight crew concentration was temporarily diverted from maximum braking to stop the aircraft to steering the aircraft back to the runway centerline after it veered to the right.
4. The decision by the Captain to reject the takeoff was made in accordance with SOP's.
5. Runway surface conditions were dry and satisfactory for maximum braking action to be achieved.

3.2. Probable Cause

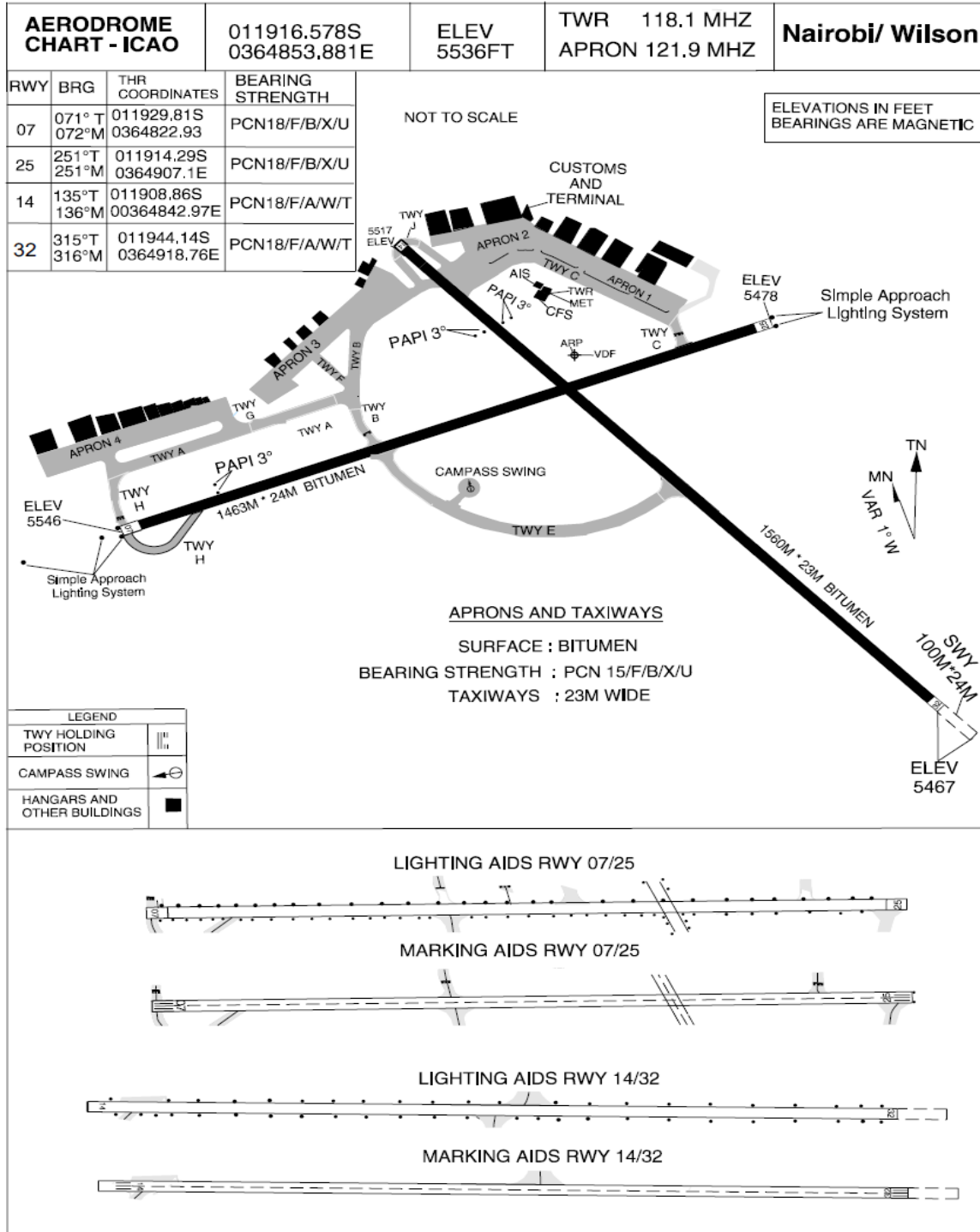
The probable cause of the incident was failure of flight crew to execute maximum continuous braking during a rejected takeoff before V_1 . The key contributory factor was concentration of the flight crew on steering the aircraft back to the runway centerline after it veered to the right.

APPENDICES

Appendix I - HKNW Aerodrome Chart

HKNW AD 2-10
26 JUL 2012

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Appendix II - Aircraft Photographs





