

PRELIMINARY REPORT ON ACCIDENT INVOLVING SIKORSKY S-76C+ HELICOPTER BELONGING TO BRISTOW HELICOPTERS NIGERIA LIMITED WITH REGISTRATION 5N-BGD WHICH OCCURED AT OWORONSHOKI AREA OF LAGOS ON THE 12<sup>TH</sup> OF AUGUST, 2015.

REGISTERED OWNER AND OPERATOR: Bristow Helicopters Nig. Ltd.  
PLACE OF ACCIDENT: Oworonshoki, Lagos.  
DATE AND TIME: 12<sup>TH</sup> of August, 2015 at about 1531hrs.  
LOCATION: Oworonshoki area of Lagos. Lat: 6<sup>0</sup> 31' 54" N and Long: 3<sup>0</sup> 26' 16" E.  
(All times in this report are local time, equivalent to UTC+1, unless otherwise stated)

## 1.0 Factual Information.

### 1.1 History of the Flight.

On 12<sup>th</sup> August, about 1531hrs, 5N-BGD, Sikorsky S-76C+, a domestic chartered flight operated by Bristow Helicopters Ltd (Nigeria), crashed into the Lagoon at Oworonshoki area of Lagos. Visual meteorological conditions prevailed at the time and a VFR flight plan was filed. The two flight crewmembers and four of the ten passengers were fatally injured. The helicopter was destroyed and there was no fire.

The departure point was an offshore oil rig (SEDCO Express) and the destination was Murtala Muhammed Airport (DNMM), Lagos.

The accident occurred when 5N-BGD was on the inbound flight of a round trip that originated from Lagos. On the outbound flight, 5N-BGD arrived SEDCO Express at about

1448hrs reportedly without incident with two passengers. This was also the first flight of the day and the helicopter did not re-fuel for the trip back to Lagos. The mobile drilling platform was located at Lat: 05<sup>0</sup> 40.9' N; Long: 004<sup>0</sup> 23.56' E, 85 NM from Lagos.

5N-BGD departed SEDCO Express about 1455hrs with twelve souls on board including two crewmembers with endurance of 1 hour 30 minutes and initially maintaining 3,000ft. The estimated arrival Lagos was 1536hrs according to the crew information before departure from the rig.

According to Air Traffic Controller's transcript, the flight first contacted Lagos at 1524:58hrs and at 1525:15hrs, the Controller acknowledged and said "5NBGD go ahead". At 1525:18hrs the pilot responded "BGD is from the SEDCO Express approaching 1,000ft and the airfield would be at 1535hrs with twelve souls endurance now one hour and 10 minutes of fuel. At 15:25:36 the controller asked the pilot "Confirm the field at 1535hrs" and the pilot answered "Affirmative GD". The flight was thus cleared to descend to 1,000ft, QNH 1015 and to report field in sight.

At 1530:19hrs, the helicopter contacted the controller and reported the field in sight. At 1530:23hrs, the controller instructed the pilot to report left downwind for runway 18L. The pilot replied "WILCO GD" at 1530:25hrs. There were no further transmissions from the pilots.

Preliminary flight recorder data indicated that at 1000ft and 120Kts, the helicopter experienced sudden pitch up, and left roll with varying attitude of yaw, roll and pitch for 12 seconds until it impacted water at about 1531hrs.

## 1.2 Injuries to Persons.

INJURIES	CREW	PASSENGERS	OTHERS
FATAL	2	4	Nil
SERIOUS	Nil	6	Nil
MINOR/NONE	Nil	Nil	Nil
Total	2	10	Nil

## 1.3 Damage to Aircraft.

The helicopter was destroyed by impact forces with water.



Fig. 1 Part of the destroyed Helicopter.



Fig. 2 Part of the destroyed tail Rotor area.



Fig. 3 The cockpit area of the wreckage.



Fig. 4 The crash site.

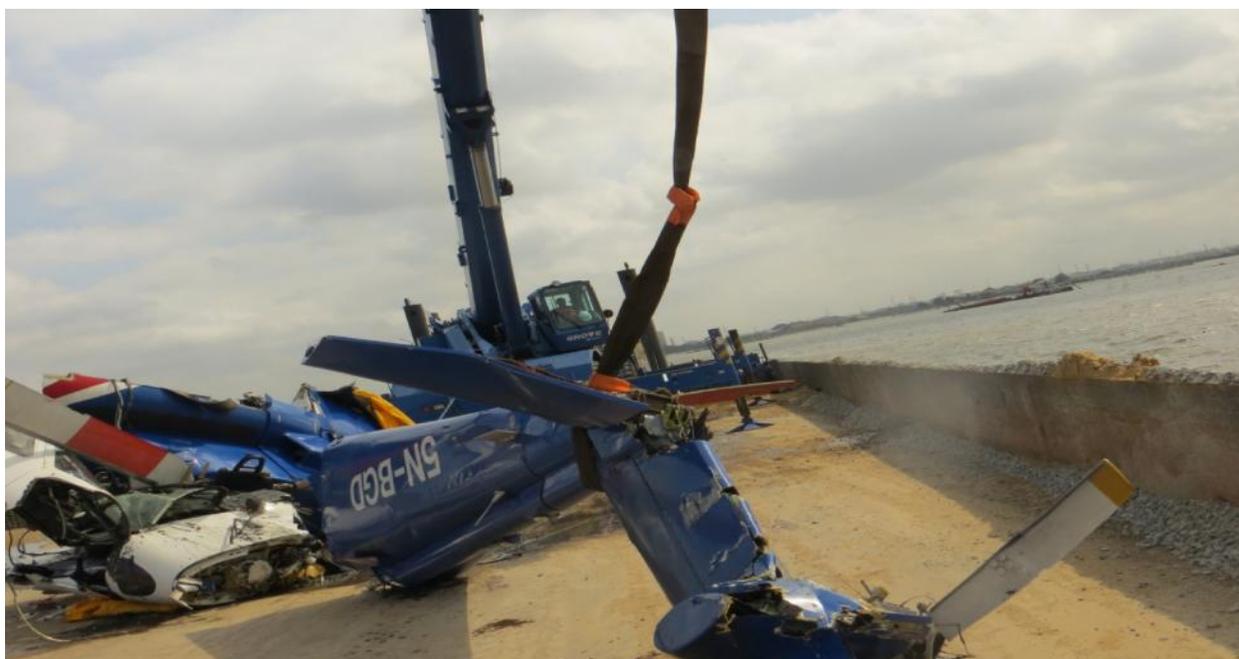


Fig. 5 Recovered parts being lifted onto the barge at the crash site.

1.4 Other Damage.  
Nil

1.5 Personnel Information:

1.5.1 Captain.

Date of Birth	-	5 <sup>th</sup> January, 1978
Nationality	-	American
Licence No.	-	5419 ATPL (H)
Medical Expiry	-	24 <sup>th</sup> October, 2015
Total Flight Hours	-	5,406:36hrs
Total Flight (PIC)	-	1,077:45hrs
Total Flight (Type)	-	1,077:45hrs

1.5.2 First Officer.

Date of Birth	-	4 <sup>th</sup> July, 1989
Nationality	-	Nigerian
Licence No.	-	6617 CPL (H)
Medical Expiry	-	31 <sup>st</sup> March, 2016
Total Flight Hours	-	808hrs
Total Flight (SIC)	-	Not Available
Total Flight (Type)	-	570hrs

1.6 Aircraft Information:

1.6.1 General Information

Type	:	S-76C+
Manufacturer	:	SIKORSKY
Airframe time	:	10,258:09hrs
Cycles	:	N/A

Serial No. : 760540  
Year of Manufacture : 2003

#### 1.6.2 Power Plant.

Engine Model: Turbomeca Arriel 2SI

##### No. 1

Serial No. : 20737TEC  
Hours : 6414:37  
Cycles : 7097((N1)/5313.2(N2))

##### No. 2

Serial No. : 20745TEC  
Hours : 5815:49  
Cycles : 5998.1((N1)/5235.3(N2))

A-Check 50hrs was carried out on the 10<sup>th</sup> of August, 2015 on the aircraft.

Type of Fuel : Jet A1

#### 1.7 Meteorological Information.

Time : 1430 UTC  
Wind : 200/09 KTS  
Visibility : 10 KM  
Weather : NIL  
Cloud : Broken 360M  
Temp./Dew point : 29/22<sup>0</sup> C  
QNH : 1015hPa  
Trend : No Significant Weather

## Flight Recorders:

The Helicopter was fitted with Solid State Combined CVR/FDR, with a common part and serial number. However, a separate Cockpit Voice Recorder was also installed on the helicopter. The recorders were recovered by professional divers in good condition from the Lagoon on the second day of the accident but the combined recorder had few punctures. The recorders were sent to Air Accident Investigation Branch UK for data download. During the download at the AAIB it was discovered that the combined Solid State Voice/Flight Data recorder only contained information of the flight data while the separate Cockpit Voice Recorder contained audio data. However, they were both successfully downloaded and are now being analyzed.

### Solid State Combined Voice/Flight Data Recorder.

Model : SCR 500-660  
Part Number : 299402-0100  
S/N : 02SRP156  
Manufacturer : British Aerospace System & Equipment

### Cockpit Voice Recorder.

Model : FA 2100  
Part Number : 2100-1010-00  
S/N : 000579228  
Manufacturer : L3 Communication



Fig. 6 The Recorders



Fig. 7 Recorders being immersed in fresh water for preservation.

### Additional Information.

Neither the crew nor the passengers had the opportunity to either inflate their respective life jackets or deploy the raft. The crew did not make a MAY DAY distress call, before the helicopter crashed into the Lagos Lagoon around Oworonshoki area at about 1531hrs. The crash site was at Lat: 6<sup>0</sup> 31' 54" N and Long: 3<sup>0</sup> 26' 16" E.

According to eyewitness account, the rescue was prompt since there were local fishermen around the crash vicinity. One of the survivors provided a graphic account of how he was pulled out of the water by a fisherman.

Six passengers were rescued alive and four fatalities recovered on 12/08/2015. The flight crew were recovered the next day on the 13/08/2015 both fatally injured.

National Emergency Management Agency (NEMA) led the rescue with Lagos State Emergency Management Agency (LASEMA) and Lagos State Waterways Authority (LASWA) playing an important role. Other agencies included; NCAA, NAMA, Nigerian Police, Nigerian Air Force, Marine Navy-International Maritime Organization/International Transport Fund (IMO/ITF), Nigerian Army, Indigo Drilling, FRSC, Civil Defence corps, Bristow Helicopters, Nigerian Maritime Administration and Safety Agency (NIMASA), Department of Petroleum Resources (DPR), Kick Against Indiscipline (KAI), The Press, etc, gave necessary support. Julius Berger Nig. Ltd played a vital role in the wreckage recovery from the Lagoon.

NEMA initially sent the rescued passengers to Gbagada General Hospital and Afolabi Medical Centre for first aid while the deceased were deposited at the Mainland Hospital morgue. The six survivors were later transferred to St. Nicholas Hospital and they are responding to treatment.

The cause of the accident has not been fully determined, as the investigation is still ongoing. Meanwhile, interim safety actions have been taken by Federal Aviation Administration (FAA) and Sikorsky by the issuing of Emergency Airworthiness Directives

(EAD) and Alert Service Bulletin (ASB) respectively on the Main and Tail Rotor Servo Input Rod assembly. This is to ensure the continued airworthiness and security of the assemblies. Bristow Helicopters Nig. Ltd. had earlier issued two Technical Directives as a safety action.

During the preliminary investigation AIB discovered that the Forward Main Servo Input Control Pushrod Assembly had failed. The Control Pushrod tube separated from Control rod end with the bearing and the Jamnut. The Jamnut was loose and was not seating against the Control Rod. See Figures 8 and 9.

National Transportation Safety Board (NTSB) Laboratory preliminary metallurgical examination of the Forward Main Rotor Servo Input Control Pushrod revealed that the separation was a pre-impact condition



Fig. 8 Control Pushrod and Control Rod end with bearing and Jamnut

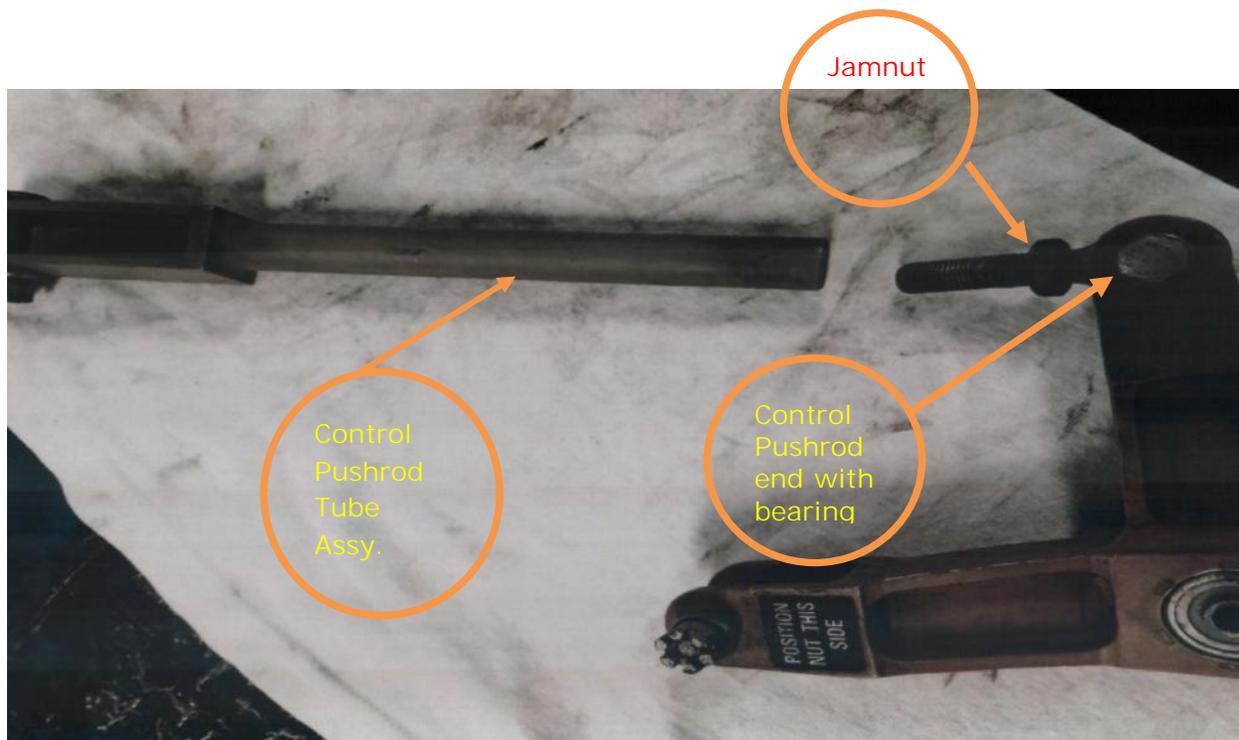


Fig. 9 The Control rod separated from the Bearing end and Jamnut

Field/Crash site examination of No.2 Engine revealed damage associated with uncontainment failure of internal components. The engines have been sent to the manufacturer in France. See Fig. 10 of the engine below.



Fig. 10 Engine No. 2 suffered an uncontained failure.

## Conclusions:

### Preliminary Findings:

1. The flight crew were certified and qualified to conduct the flight in accordance with applicable Nigerian Civil Aviation Regulations (Nig.CARs).
2. The Captain and Co-pilot had 1077:45 and 570 hours on the aircraft type respectively.
3. The crew and passengers life vests were not activated.
4. The crew did not declare an emergency, according to FDR data the upset lasted for 12 seconds.
5. There were twelve souls on onboard including two crewmembers at the time of the accident.
6. The aircraft crashed into the Lagos Lagoon at the Oworonshoki area of Lagos
7. There was no evidence of fire outbreak before and after the crash.
8. The life rafts on the helicopter were observed deflated and floating in the Lagoon but were not deployed.
9. The wreckage of the helicopter was confined in a small area around the crash site in the Lagoon.
10. The main wreckage was submerged in the Lagoon.
11. The two raft inflation bottles under the crew seats were still fully charged.
12. The Helicopter was manufactured in 2003 with total Airframe Hours of 10,258:09
13. The helicopter was maintained in accordance with approved Maintenance schedule.
14. No records of any deferred defects in the tech log.
15. The Control Pushrod tube separated from Control rod end with the bearing and the Jamnut. The Jamnut was loose and was not seating against the Control Rod.
16. The flight departed from the SEDCO Express Rig and was uneventful until about 5 minutes to landing.
17. The flight preceding the accident aircraft was without incident.
18. There was good communication between the helicopter and the Tower before the accident.

19. The Rescue was promptly carried out by fishermen operating their boats around the crash site.
20. The surviving passengers reported the flight was normal until the helicopter suddenly spiraled, descended and impacted the waters of the underlying lagoon.
21. Field examination suggested that No. 2 engine suffered an uncontained failure.
22. The combined Solid State Voice/Flight Data recorder only contained information of the flight data.
23. Preliminary flight recorder data indicated that at 1000ft and 120Kts, the helicopter experienced sudden pitch up, and left roll with varying attitude of yaw, roll and pitch for 12 seconds until it impacted water at about 1531hrs

## Interim Safety Actions

The outcome of AIB preliminary investigation resulted in the following Interim Safety Actions taken by Sikorsky and Federal Aviation Administration (FAA).

1. On the 10<sup>th</sup> of September, 2015, Sikorsky Aircraft Corporation issued Alert Service Bulletin (ASB) 76-67-57 on all S-76 model helicopters equipped with Control Pushrod Assembly P/N 76400-0034-059 and 76400-00014-071.

Purpose: "To perform a onetime inspection of installed Forward, Aft and Lateral Main Servo Input Control Pushrod s and Jamnuts and Tail Servo Input Control Pushrods and Jamnuts for proper installation, condition and security followed by application of slippage mark on all Main and Tail Servo Input Control Pushrod Jamnuts".

Compliance: "Compliance is essential. The instructions outlined herein shall be accomplished prior to next flight originating from a maintenance facility or not to exceed 5 flight hours from issue date of this ASB".

2. On the 14<sup>th</sup> September, 2015, The Federal Aviation Administration (FAA) issued Emergency Airworthiness Directives (EAD) 2015-19-51 to owners and operators of Sikorsky Aircraft Corporation model S-76A, S-76B, S-76C and S-76D helicopters. This was related to service information from Sikorsky issued Alert Service Bulletin No. 76-67-57 of 10<sup>th</sup> September, 2015.

## Interim Safety Recommendations:

Accident Investigation Bureau considers the ASB and EAD as interim actions which define an unsafe condition. The failure of the pushrod assembly could result in loss of main rotor or tail rotor flight control and consequent loss of control of the helicopter.

Interim Safety Recommendations-2015-009:

Sikorsky Aircraft Corporation should consider a redesign of the affected control pushrod assembly by introducing additional wire locking safety features between the Jamnut and the Pushrod to enhance better security.

Interim Safety Recommendations-2015-010:

Nigerian Civil Aviation Authority (NCAA) should immediately carryout appropriate oversight action on all the Sikorsky S-76 series helicopters flying in Nigeria to ensure the implementation of the Emergency Airworthiness Directives (EAD) and Alert Service Bulletin (ASB) issued by FAA and Sikorsky Aircraft Corporation.

Further Information and Investigative Action.

Future investigative activities will include, but not limited to, the following:

- Metallurgical examination of the Main Servo Input Control Pushrod (MSICP).
- Evaluation of the aircraft approved maintenance program.
- Determination of the helicopter maintenance history.
- Follow-up examination of the engines and aircraft flight control components.
- Detailed reconstruction of flight based on recorded data.
- Analysis of the helicopter performance.
- Interview of relevant personnel.
- The engines, Rotors and other components teardown will be performed overseas with the supervision of AIB investigators.
- Review of Bristow Helicopters Maintenance processes, culture and maintenance error correction program.



Photo 1. The helicopter recovered wreckage



Photo 2. The recovery Barge.



Photo 3. Professional Divers during the wreckage recovery exercise.



Photo 4. Local fishermen / rescuers at the crash site



Photo 5. Investigators, Search and Rescue personnel on recovery mission.