

MINISTRY OF TRANSPORT, INFRASTRUCTURE, HOUSING, URBAN DEVELOPMENT AND PUBLIC WORKS

\$TATE DEPARTMENT FOR TRAN\$PORT

Aircraft Accident Investigation Preliminary Accident Report 5Y-KDL 03.03.2019

BELL 505

CENTRAL ISLAND NATIONAL PARK, TURKANA

March 11, 2019

PRELIMINARY REPORT SUMMARY

OPERATOR:Kwae Island Development LimitedAIRCRAFT TYPE:Bell 505MANUFACTURER:Bell Helicopter Canada Ltd.YEAR OF MANUFACTURE:2013

i

AIRCRAFT REGISTRATION	:	5Y-KDL
AIRCRAFT SERIAL NUMBER	:	65037
DATE OF REGISTRATION	:	18 July 2018
NUMBER AND TYPE OF ENGINE	:	One Turbomeca Arrius 2R Turboshaft
DATE OF OCCURRENCE	:	3 March 2019
LAST POINT OF DEPARTURE	:	Turkana Central Island
		(3°30′06″N 36°02′26″E)
POINT OF INTENDED LANDING	:	Lobollo Camp
TIME OF OCCURRENCE	:	2035 hours Local Time (LT)
LOCATION OF OCCURRENCE	:	Central Island National Park Turkana
TYPE OF FLIGHT	:	Commercial (Passenger)
PHASE OF FLIGHT	:	Take-off
NUMBER OF PERSONS ON BOARD	:	Five (5)
INJURIES	:	Fatal (5)
NATURE OF DAMAGE	:	Aircraft destroyed
CLASS OF OCCURRENCE	:	Accident
PILOT IN COMMAND	:	YK-4964-AL
PIC's FLYING EXPERIENCE	:	5500 hours

All times given in this report are East African Local Time (UTC +3)

OBJECTIVE

This preliminary 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 the accident.

This investigation has been carried out in accordance with The Kenya Civil Aviation (Aircraft Accident and Incident Investigation) Regulations, 2018 and Annex 13 to the ICAO Convention on International Civil Aviation.

The sole 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.

Table of Contents

PRELIMINARY REPORT SUMMARY	i
OBJECTIVE	ii
TABLE OF FIGURES	vi
LIST OF TABLES	vi
ABBREVIATIONS	viii
SYNOPSIS	1
1.0 PROCESS AND PROGRESS OF RHE ACCIDENT INVESTIGATION	2
1.1 Summary of the accident	2
1.2 Breakdown of the accident investigation	2
1.2.1 The investigative organization	2
1.2.2 The accredited representatives participating in the investigation	2
1.2.3 Implementation of the Investigation	3
2.0 FACTUAL INFORMATION	4
2.1 History of the Flight	4
2.1.1 Location of the occurrence.	6
2.2 Injuries to Persons	7
2.3 Damage to Aircraft	7
2.4 Other Damage	7
2.5 Captain's Information	8
2.6 Aircraft Information	9
2.6.1. General	9
2.6.2. 5Y-KDL	9
2.7 Meteorological Information	
2.8 Aids to Navigation	

2.9 Communication	. 14
2.10. Aerodrome information	. 14
2.11. Flight Recorders	. 14
2.12. Wreckage and Impact Information	. 14
2.12.1 Emergency locator transmitter	. 18
2.13 Medical and Pathological Information	. 19
2.14 Fire	. 19
2.16. Tests and Research	. 19
2.17. Organizational and Management Information	. 20
2.18 Search and rescue	. 20
2.19 Additional Information	. 20

TABLE OF FIGURES

Figure 1: Aerial view of the helicopter's final resting point	6
Figure 2: Aerial view of the helicopter's wreckage at the Central Island. (closer vi	ew)6
Figure 3: The wreckage of the damaged aircraft	7
Figure 4: Photo of 5Y-KDL before the accident	9
Figure 5: Satellite Image at 1930 on 03/03/2019:	12
Figure 6: Satellite Image at 2100 on 03/03/2019:	13
Figure 6: Broken main rotor blade and the resultant ground mark.	15
Figure 7: Detached empennage section	16
Figure 8: Tail rotor component assembly	16
Figure 9: Damaged lower swashplate (static) and connecting rods	17
Figure 10: Broken main rotor blade	17
Figure 11: Damaged upper swashplate (movable)	18
Figure 12: High impact damage to the main rotor blades at their attachment	19

LIST OF TABLES

Table 1: Injury chart	5
Table 2: Summary of the captain's relevant information	6
Table 3: Summary of the Aircraft details	8
Table 4: Summary of the prevailing Meteorological conditions	9
Table 5: Meteorological information Key	9

ABBREVIATIONS

AAID	-	Air Accident Investigation Department
AGL	-	Above Ground Level
AMSL	-	Above Mean Sea Level
ATPL	-	Airline Transport Pilot License
ELT	-	Emergency Locator Transmitter
GPS	-	Global Positioning System
ICAO	-	International Civil Aviation Organization
KCAA	-	Kenya Civil Aviation Authority
KIDL	-	Kwae Island Development Limited
KTS	-	Knots
LH	-	Left Hand
LT	-	Local Time
RH	-	Right Hand

SYNOPSIS

The report describes the 3rd March 2019 aircraft accident involving a Bell 505X registration 5Y-KDL operated by the Kwae Investment Development Ltd (KIDL). The fatal accident occurred on Central Island in Lake Turkana.

In strict adherence to requirements by ICAO, the AAID notified the respective states of the occurrence, i.e.; the State of manufacture of Bell helicopters, State of Manufacture of the Powerplant and the State whose citizens suffered fatal injuries. The ICAO was also notified of the occurrence.

Investigation of the accident involving 5Y-KDL is still ongoing to determine the facts, conditions and circumstances of the accident in order to establish the probable cause.

1.0 PROCESS AND PROGRESS OF THE ACCIDENT INVESTIGATION

1.1 Summary of the accident

The aircraft took off from Central Island with five persons onboard, the destination was back to Lobollo camp after a scenic flight earlier on that day. The aircraft was in the company of another helicopter 5Y-TNF on all legs of flight that day. On the journey back to camp, 5Y-KDL lost communication contact, upon which the pilot on 5Y-TNF decided to complete the journey before reporting the incidence.

The Aircraft Accident Investigation Department (AAID) was informed of the disappearance of 5Y-KDL at 2124hrs by KIDL Accountable Manager.

The search and rescue team located the wreckage at around 0310 hours on 4th March 2019 and it was found to have been destroyed; all five persons onboard suffered fatal injuries.

1.2 Breakdown of the accident investigation

1.2.1 The investigative organization

The Accident Investigation Department is the organization mandated by ICAO Annex 13 to conduct all aircraft accidents occurring in Kenya. The Chief Inspector of accidents assigned one investigator-in-charge (IIC) to the accident on March 10, 2019.

1.2.2 The accredited representatives participating in the investigation

Accredited representatives from the State of aircraft manufacture, Canada, the state of engine manufacture, France and their technical advisors took part in this investigation

1.2.3 Implementation of the Investigation

2019 March 04 – 07:	Initial Site Visit
2019 March 08:	Arrival and briefing of the ACCREP and their advisors
2019 March 09 – 12:	On-site investigation and interviews

2.0 FACTUAL INFORMATION

2.1 History of the Flight

On 3rd March 2019 at 2124, the Aircraft Accident Investigation Department (AAID) was notified of an accident at Central Island National park in Turkana County by the Air Traffic Control. The accident involved a commercially owned Bell 505X helicopter of registration 5Y-KDL. A Search and Rescue was reported to have already been initiated from Lobollo arriving at the island at approximately 2320. The aircraft was found to have crashed in western area of the Island adjacent to the Flamingo lake, on the edge of the cliff.

Earlier that evening, 5Y-KDL together with 5Y-TNF (Robinson R44) took off from the Lobollo camp at approximately 1745 for a tourist scenic flight. On board the B505 were four tourists and the pilot, while on board the R44 were 3 tourists and 1 pilot. Both aircraft safely landed on Central Island shortly after 1800, they powered off both helicopters and the passengers disembarked. Fifteen minutes later at around 1815, the pilot (5Y-TNF) reports that they were hit by a very strong wind from the East. According to the pilot, this forced them to hold down the helicopters and the rotor blades as they waited for wind to abate until after sunset.

Both helicopters then started at approximately 2034 and after communicating with 5Y-KDL, the R44 took off first in an Easterly direction before climbing to approximately 300 feet above ground. He then turned left around the takeoff point before proceeding directly towards Lobollo camp on a South Westerly heading (Lobollo lights were visible). As he came abeam the takeoff point, the pilot of 5Y-TNF could see that 5Y-KDL was still on the takeoff point and could identify his position lights and anti-collision light.

Once established the pilot of 5Y-TNF tried to make radio contact to 5Y-KDL, to which he received no reply. He tried these four to five times without reply

At about 2042, from a distance of approximately 2.4 nm and 400 ft from the takeoff point, the pilot (5Y-TNF) turned slightly to the right in order to look back at the take-off point to try and establish visual contact with 5Y-KDL.

At this point the pilot believes he received some radio transmissions that were indistinct and muffled in what could have been expletives. At the same time, he believes that he saw lights (not clear whether anti-collision/navigation or landing lights) moving erratically [and possibly spinning] above the horizon of the island. The pilot (5Y-TNF) could not recall seeing evidence of an impact but one of his female passengers claimed to see a flash.

The pilot (5Y-TNF) elected to fly directly to Lobollo to take his passengers to safety while still trying to make radio contact with 5Y-KDL. Ten minutes after arrival, 5Y- TNF made contact to the KIDL Head of Operations and immediately initiated search and rescue at 2053. The SAR team departed for the island by boat arriving at the Central Island at approximately 2320. At approximately 0310 on the 4th of March the team managed to find the wreckage. At 0325 the team lead managed to purvey the information to KIDL Head of operations who later on managed to inform the AAID at 0450 for subsequent initial site visit and recovery.

The aircraft was found to have been destroyed by the post-impact fire. All the five persons on board sustained fatal injuries. There was no reported injury to persons on ground.

The safety investigation is currently ongoing.

2.1.1 Location of the occurrence.



Figure 1: Aerial view of the helicopter's final resting point on Central Island.



Figure 2: Aerial view of the helicopter's wreckage at the Central Island. (closer view)

2.2 Injuries to Persons

Table 1: Injury chart

Injuries	Crew	Passenger	Others
Fatal	1	4	0
Serious	0	0	0
Minor/none	0	0	0
Total	1	4	

2.3 Damage to Aircraft

The aircraft was destroyed.



Figure 3: The wreckage of the damaged aircraft

2.4 Other Damage

There was spillage of oil and fuel to the ground and the surrounding vegetation was consumed by the resulting fire.

2.5 Captain's Information

From the records available at the time of the crash, the pilot of 5Y-KDL was a 45-year old Kenyan male citizen. He held an Airline Transport Pilot License (Rotorcraft) issued by the KCAA on the 19th of February 2016. The pilot had five aircraft type ratings endorsed on his license all under Group 1.

On December 21st 2018, the pilot had undergone a medical examination from which he was declared fit and issued with a class one certificate valid for 6 months.

Furthermore, he was in possession of a Flight Radio Telephony Operator's License number YK-4964-RL. It was issued by the KCAA on 27th December 2017 with a validity up until 5th January 2020.

18 th July 1974 (45 years)
Male
Kenyan
Airline Transport Pilot License (Helicopters)
YK-4964-AL
19 th February 2016
11 th May 2016
Expires on 5 th July 2019
Airbus AS350, Bell 412, Bell 505, BK 117,
Eurocopter EC130, Schweizer H269,
~5500
~15
Class one medical
Examined on 21 st December 2018
Valid for 6 months

Table 2: Summary of the captain's relevant information

2.6 Aircraft Information

2.6.1. General

The accident aircraft is a Bell 505 (Trade name Jet ranger X). It is made up of hybrid composite/metallic structure with composite side panels and aft fuselage skins. Further, it has three doors, that is; one large hinged pilot and copilot door on each of LH and RH side, and one hinged passenger door on the copilot side.

The aircraft was fitted with a monocoque structure tail boom with a vertical fin and a fixed horizontal stabilizer.

2.6.2. 5Y-KDL



Figure 4: Photo of 5Y-KDL before the accident

5Y-KDL serial number 65037, was assembled in Kenya less than a year from the date of occurrence. It has a seating capacity of 3+2 persons inclusive of the pilot. The helicopter is certified for single pilot operation. It was registered on 18th July 2018 and was operated by Kwae Island Development Limited (KIDL Helicopters).

Table 3: Summary	of the Airc	raft details
------------------	-------------	--------------

Manufacturer	Bell Textron Inc.
Model	Bell 505
Serial Number	65037
Registration	5Y-KDL
Date of Manufacture	2013
Category	Commercial Air Transport (Passengers)
Number and type of engines	One, Turbomeca Arrius 2R
Total Airframe hours	129.0
(as at xx/March/2019)	
Total Airframe cycles	388
(as at xx/March/2019)	

- The aircraft had a valid Certificate of Airworthiness (CoA) No. 0070 issued on 1st August 2018 with an expiry date of 31st July 2019.
- From the CoA, the aircraft was certified for Commercial Air Transport (passengers) category
- The aircraft had a certificate of release to service issued on 12th February 2019 following a routine 50 hours inspection.
- The type of fuel used was Jet A-1.

2.7 Meteorological Information

According to the written statement given by the pilot flying 5Y-TNF, both his aircraft and the accident aircraft experienced strong easterly winds after landing at Central Island National park. According to him, they were forced to hold down the helicopters and rotor blades, the wind was so strong that it prevented them from starting in fear of a tail strike by the rotor. He (5Y-TNF) reports that after the wind dropped and conditions allowed for start, he carried out an inspection of the rotor blades of his helicopter and found no damage. He proceeded to start with the accident pilot watching if everything was okay.

He goes on, "The conditions were good, however there was a very distant big storm to the east heading our way."

Lodwar Meteorological station is the nearest representative station to the area under consideration at Latitude 3.1155°N and Longitude 35.6041°E and altitude 477 meters. The prevailing weather conditions between 1930 and 2130 were partly cloudy with good visibility. The wind speed at 10,000 ft AMSL was between 5 to 15 knots while at 18,000 ft AMSL the wind was 20 knots mainly easterlies.

 Table 4: Summary of the prevailing Meteorological conditions

Time (LT)	Altitude (ft)	Wind	Speed (kts)	
	AMSL	Direction		
1930 - 2130	10,000	North Easterly	5 - 15	
1930 - 2130	18,000	North Easterly	20	

Table 5: Meteorological information Key

Кеу:	
Orange/ brown/ red background:	Convective (Thunder) clouds.
White background:	Low-level clouds.
Black background:	Area with no clouds.



Figure 5: Satellite Image at 1930 on 03/03/2019: indicating scattered clouds over Central Lake Turkana (Courtesy of Meteorological Department of Kenya)

The Graphical Area of the Satellite image for 1930hrs indicated that the area was covered with high cirrus clouds (appearing grayish). Neighboring area appearing yellow was covered with shallow clouds.



Figure 6: Satellite Image at 2100 on 03/03/2019: indicating moderate winds at 18,000ft AMSL (Courtesy of Meteorological Department of Kenya)

The area of interest circled in green shows that winds (shown in red bars) were moderate in strength and generally blowing from the North East.

2.8 Aids to Navigation

Magnetic compass, GPS, maps and a Garmin G1000H were available as aids to navigation on the helicopter.

2.9 Communication

The operations being carried out in a remote area, there was no control tower. However, the pilot for 5Y-TNF reports that after take-off, he tried to establish contact with 5Y-KDL to which he received no reply. A few minutes later the pilot on 5Y-TNF reports that he heard indistinct and muffled communication amid static interference after which communication with the accident helicopter was completely lost.

2.10. Aerodrome information

There was no aerodrome involved in this investigation.

2.11. Flight Recorders

The helicopter was not fitted with flight recorders, nor was it a requirement.

2.12. Wreckage and Impact Information

The wreckage of the helicopter was found on the hilly area of Central Island National Park, at an elevation of 448metres, coordinates (03°30′100″N 36°02′434″E). It was confined to an area of about 24 meters diameter.

- (1) The tail boom was severed near its aft end
- (2) One main rotor blade separated rotor hub leaving evidence of the twisted fibre material.
- (3) The mast separated from the swashplates
- (4) One main rotor blade had broken off near its attachment to the hub
- (5) The other main rotor blade suffered a longitudinal crack and broke of at the tip.
- (6) The rubber casing covering the mast had completely separated from the aircraft.
- (7) The tail rotor component assembly was found to be generally intact with the crosshead, pitch change links and the tail rotor gearbox connector shaft
- (8) At the point of impact, visual examination of the engine indicated that at the time of impact, the engine was under significant power



Figure 6: Broken main rotor blade and the resultant ground mark.

The vertical stabilizer and tail rotor were found detached from the tail boom 54 meters from the main wreckage location.



Figure 7: Detached empennage section



Figure 8: Tail rotor component assembly



Figure 9: Damaged lower swashplate (static) and connecting rods



Figure 10: Broken main rotor blade found 12 metres from the main wreckage



Figure 10: Damaged upper swashplate (movable)

2.12.1 Emergency locator transmitter

5Y-KDL was equipped with an emergency locator transmitter (ELT). There was no ELT 406 MHz signal recorded by the Rescue Coordination Centre (RCC), nor was a 121.5 MHz signal received by search and rescue aircraft.



Figure 12: High impact damage to the main rotor blades at their attachment location

2.13 Medical and Pathological Information

Pathological and toxicological tests are to be carried out.

2.14 Fire

The integrity of the fuel tanks was compromised on impact which led to fuel spillage and subsequent burning of the wreckage and any possible survivors.

The area being dry, remote and there being no Emergency Fire services to quench the fire burnt till its own natural stop.

1.15. Survival Aspects

From the condition of the wreckage, the accident was not survivable.

2.16. Tests and Research

Currently, detailed investigations on-site and recovered parts and components on-going.

2.17. Organizational and Management Information

Kwae Investment Development Limited (KIDL) is a company incorporated on the 9th September 2009. KIDL is in possession of a valid Air Operator Certificate (AOC) number 239, expiry due on 4 May 2019. The company has a total of five helicopter pilots. The company operated a total of six aircraft. The fleet was composed of three Airbus H125, H130, BK117 and Bell 505 Jet Ranger X. The company was involved in commercial flights mainly: Charter flights, Medical evacuations, tracking and security and Scenic flights. Records available from the KCAA, the accident pilot was at the time the Chief Pilot of KIDL.

2.18 Search and rescue.

According to the pilot on 5Y-TNF, the last radio transmission by 5Y-KDL was indistinct and muffled amid static after which there was no further radio contact.

Soon after the pilot flying 5Y-TNF landed, he contacted KIDL Head of Operations and immediately search and rescue protocol was initiated. A search party was dispatched from Lobollo camp arriving on Central Island at approximately 2320 hours. The team continued with the search until approximately 0310 hours when they found the wreckage. This was then communicated to KIDL Head of Operations who in coordination with the Rescue Coordination Centre notified all relevant authorities.

2.19 Additional Information

This is the first ever accident of the Bell 505.

The investigation is continuing and a final report is expected to be published during the first quarter of 2020.

Fredrick Kabunge

Investigator-In-Charge 11/03/2019