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NAIROBI

AIR ACCIDENT INVESTIGATION

Factual Accident Report on

Cessna 206

Registration 5Y-BUG

Abardare Ranges

25 JULY 2013

This investigation was carried out in accordance with Annex 13 to the Convention on International Civil Aviation; it is not the purpose of aircraft accident investigation to apportion blame or liability. The sole objective of the investigation and the Final Report is the prevention of accidents and incidents.



CIVIL AIRCRAFT ACCIDENT REPORT

CAV/AAC/5Y-BUG/13

OPERATOR: PRIVATE

OWNER: HARRO TREMPENAU

AIRCRAFT: CESSNA 206

REGISTRATION: 5Y-BUG

PLACE: ABERDARE RANGES (00°36.630 S 036°41.70 E)

DATE: 25 JULY 2013

TIME: 1658 hours

All times given in this report is East African Local Time (UTC plus 3 hours).

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TERMS AND ABBREVIATIONS

AAID - Air Accident Investigation department

AIS – Aeronautical Information Services
AME – Aviation Medical Examiner
AMO – Approved Maintenance Organisation
Amsl – above mean sea level
ACC – Area Control Centre
ASDA – Accelerate - Stop Distance Available
ASI – Attitude Station Indicator
ATO – approved Training Organisation
VSI – Vertical speed Indicator
CAVOK – Clouds cover and visibility OK
CoA – Certificate of Airworthiness
CoR – Certificate of Registration
CPL – Commercial Pilot Licence
CRS – Certificate of Release to Service
EA – East Africa (n)
FIC- Flight Information Centre/ control
FL – Flight Level
Ft – feet
GFT – General Flight Test
HKLU – Lamu
Hr(s) – Hour(s)
Hz – Hertz
IMC – Instrument Meteorological Conditions
KAA – Kenya Airports Authority
KCAA – Kenya Civil Aviation Authority
Kts – knots
LH – Left Hand

Ltd – Limited

Min – Minutes

N/A - Not applicable

NOTAM – Notice to Airman

Ops – Operations

PPL – Private/Professional Pilot Licence

RH – Right Hand

RMI – Radial Magnetic Indicator

RWY – Runway

SAR – Search and Rescue

UTC – Coordinated Universal Time

VHF – Very High Frequency

VFR – Visual Flight Rules

VMC - Visual Meteorological Conditions

WAP - Wilson Airport

Empennage - Tail assembly

SYNOPSIS

The aircraft a Cessna 206, was inbound Wilson Airport from Lendille with three occupants on board. The aircraft had been chartered by Yellow Wings Air

Services to operate a few flights on that day since the Yellow Wings aircraft which was to operate developed a technical problem on starting up for the first flight of the day.

The pilot estimated his arrival time at Wilson Airport to be 1725, which he communicated to Yellow Wings operations officer on duty via Global System for Mobile Communications GSM text at 1641 stating “All ok”.

The aircraft did not arrive at the estimated time of arrival, ETA prompting Yellow Wings to raise an alarm. They informed Wilson Tower who in turn tried to initiate contact with the Cessna 206 on radio with no success.

Yellow wings Chief Pilot also took off from Wilson Airport late in the evening and flew Northerly up to the Wilson Airport Control Zone Boundary to try and locate the same aircraft without success.

Yellow Wings put up a search and rescue team together in the evening of 25th July at their premises. AAID investigator joined the Yellow Wings search and rescue team on 26th July 2013 and left with the same team for a search and rescue mission to the West of the Aberdare ranges.

The wreckage was found on Saturday 27th July 2013 by a Kenya Wildlife helicopter pilot having impacted high ground almost at the top of the Aberdare ranges. There were no survivors.

The investigation determined that the probable cause of the accident was inability of the aircraft to maintain terrain clearance in high terrain area in low level clouds with low visibility.

1. FACTUAL INFORMATION

1.1. History of Flight

The aircraft departed from Orly Air Park, at 1000 hours on a charter flight. The pilot landed at Maara airstrip where he picked two passengers to take them to Nanyuki Civil airport. He landed at Nanyuki at 1200 hours, where he had lunch. A few minutes before 1600 hours the pilot departed Nanyuki for Lendille, where he picked up two passengers then set course for Wilson airport.

A direct flight from Lendille to Wilson would have taken a track of 190°. The leg would have taken one hour twenty minutes flying at a speed of 80 kts in calm weather..

The pilot took off from Lendille at around 1600 hours. Upon establishing a VFR cruise level, he relayed a text message to Yellow Wings operations office on his cell phone and informed the operations that he was airborne and estimated WAP at 1700 hours

The aircraft appeared on the FIC/ACC radar from 1631 on a track of 220° at an altitude of 5887 ft. From the initial time the aircraft appeared on radar, it remained monitored on radar for 27 minutes before radar contact was lost. While in contact with radar, the aircraft did not maintain a steady heading. The radar track depicts unstabilised heading as shown

[radar heading plot graph](#)

1.2. Injuries to persons

| Injuries | Crew | Passengers | Others |
|-----------------|-------------|-------------------|---------------|
| Fatal | 1 | 2 | - |
| Serious | - | - | - |
| None | - | - | |

1.3. Damage to Aircraft

The aircraft was destroyed on impacting the ground.

1.4. Other damage

None

1.5. Personnel Information

1.5.1 The Captain

The pilot was a Kenyan male of German origin aged 67 years old. At the time of the accident, he held both PPL and CPL issued by KCAA. The pilot attained PPL on 16/8/89 after passing all PPL written subjects. He and the General Flight Test (GFT) on C206 type of aircraft on 31/5/89. His performance was marginal and the instructor recommended ***"a few more glide approaches due to judgement problems" required to fly another dual session of not less than 50 min to practice glide approaches***". The pilot attained CPL on 16 June 1999. In 1998 he acquired his first aircraft a Cessna 206 Registration 5Y-HVT. In December 2001 he was checked out for aircraft type rating in C150, C182 and C206. The pilot maintained regular renewal of both his PPL and CPL and kept medical current. According to records available the pilot flew regularly as a commercial pilot . He was engaged in commercial flights and occasionally in parachute jumping drops from his aircraft or any other.

The pilot attained the age of 65 years on 16 September 2011. According to of PEL, Regulations, 2007 Regulation 13(4) ***"A holder of a pilot licence who has attained the age of 65 years shall not act as a pilot of an aircraft engaged in commercial air transport operations."*** The Civil Aviation Regulations 2013, regulation 15(5) adds ***"A holder of a pilot licence who has attained the age of 65 years shall operate only under the privileges of a Private Pilot Licence (PPL)"***.

Between September 2011 and 17 December 2012 the pilot applied to KCAA Personnel Licensing for CPL renewal three times and each time the application was granted/ renewed. His last CPL expired on 19 June 2013. On 16 May 2013 KCAA licensing office wrote to the pilot informing him about his age status and should comply with Civil Aviation (Personnel Licensing), Regulations, 2013, regulation 15 (4) and (5). After the notification letter there is no evidence that the pilot applied for his CPL renewal.

| | |
|---------------------|---|
| Date of Birth/Age | 16 September 1946/67 years |
| Sex | Male |
| Nationality | Kenyan |
| Type of License | CPL and PPL SEL(Aeroplanes) |
| Validity of license | CPL Valid till 19/6/13 PPL Valid till 18/12/13 |
| Flying experience | Total hours 4820 Last 90 days 30.40 hours Last 30 days 13.55 hours Last 7 days not known |

The pilot was in command and flying the aircraft at the time of the crash. From records available there is evidence that the pilot had flown on the same route on several occasions. The pilot had adequate flight time of 4820 hours to be experienced in both aircraft handling and route flying. The pilot was not instrument rated and therefore could not fly in IMC. Records available reveal that the pilot performed proficiency checks lastly in 2004. For a couple of years in the recent past he flew commercially mainly for Aeronav and sparingly for Yellow Wings Air Services.

The pilot conducted his own business marketing and used Aeronav AOC to carry out commercial flights. Most of the flights entered as Aeronav were personal businesses and not necessarily engagement by Aeronav

The pilot was having marital problem with his British wife who lived in Karen. At the time of the accident he was living near Orly airpark with a girlfriend.

1.6 Aircraft Information

The aircraft a C206 was first registered in Kenya in 1994 by the first owner Mr Mark Ross. It was maintained and serviced by various AMOs. It changed hands of ownership to Mr Raimondo Raimondi on 18th August 2011. Finally it was purchased and registered under Argonaut Limited on 6th December 2012. Argonaut Limited was a limited company founded by the pilot and another Kenyan. Argonaut was incorporated in Kenya on 11th April 2001. The aircraft was registered/insured under commercial category.

The aircraft was insured by Phoenix of E. A. Assurance Company Limited. The aircraft was insured jointly between the pilot, Agronaut Ltd and Kenya School of flying. The insurance policy NO 2010/AV/00115/04 was issued on 26th October 2012 and was valid from 26th October 2012 to 25th October 2013. It was insured

under commercial category to operate in East Africa and off shore islands excluding UN Section areas.

Other aircraft details are:

| | |
|------------------------------|--|
| Manufacturer: | Cessna |
| Type: | U206 |
| Registration: | 5Y-BUG |
| SN: | U-206-02880 |
| Year of manufacture: | 1975 |
| Number and Type of engine | 1 TCM 10-520F |
| Number of propeller blades: | 3 |
| Certificate of Registration: | First registered in Kenya on 18 th May 1994 |

Latest registration Dated 6th December 2012

Certificate of Airworthiness:

1.6.2 Maintenance records

The aircraft was maintained by Knight Aviation, Kenya School of Flying, AMREF-Flying Doctors and Aero Maintenance services Limited. The first three were authorised and held AMO certificates issued by KCAA. Aero Maintenance services were the latest AMO contracted for maintenance of 5Y-BUG.

Available records indicate that the aircraft was serviced as per maintenance schedule. Completion of all periodical services and repairs were confirmed by Certificate of Release to Service (CRS) issued every time the aircraft went through Check I, II or III. The last CRS was issued by Aero Maintenance Service on 6th May 2013. The latest recorded aircraft status was:

Aircraft hours: 5494.10 hours

Engine time since new: 1831 hours

Propeller total time: 2454.1 hours

The aircraft airworthy condition at the time of accident was considered satisfactory and was not a factor in this investigation.

1.6.2.1 Aircraft maintenance

The aircraft was maintained by AMREF 'Flying Doctors. AMREF is an authorised AMO certificated by KCAA. The aircraft was issued with C of A annually as per records available. Periodical check 1, II and III were conducted successfully.

1.6.2.2 Aircraft performance

According to records available during Check III inspection conducted on 23 January 2012 cylinder compression checks were confirmed within normal limits and engine tested in flight and found satisfactory.

1.6.2.3 Aircraft instrumentation

The last instrumentation tests carried out on the aircraft was completed on 21 January 2013. A CRS was issued for inspection of C of A renewal. The purpose of instrument/systems test was to check serviceability and calibration on instruments namely ASI, VSI and altimeter. They were found within limits.

1.6.2.4 Aircraft systems

Flight controls were inspected and rigged during Check III inspection on 23 January 2012.

1.6.3 Mass and Balance

The aircraft mass and balance was not considered as a factor in this investigation.

1.7 Meteorological Information

In the months of June and July the country experiences a cold weather marked by low clouds, thick fog (especially on high grounds) and poor visibility. The fog can extend to the ground surface. The weather was reported to have been very marginal. There were low clouds with fog and showers. A search and rescue team that was formed immediately operated more than six aircraft for two days without success due to poor weather at the Aberdares where the aircraft 5Y-BUG was anticipated to have disappeared. There is no weather reporting stations en route over the Aberdare mountain ranges.

Witnesses who formed the team of search and rescue from 25 July 2013 to 27 July 2013 confirmed the weather at the Aberdares was composed of low clouds and fog. Visibility was less than one hundred meters. The weather hampered the search for the three days such that more than six aircraft deployed to search for

BUG were not successful in two days. They had to abandon the search on two occasions due to poor VFR weather.

The weather briefing is offered by WAP met office. It only offers terminal weather which does not go beyond the aerodrome control zone. There are not enough weather stations in the country that may provide appropriate weather en route. There is only a handful of webcams that provide weather information within a small radius of their location. None of the webcams is on the track that the pilot followed.

On 25th July 2013 when the aircraft 5Y-BUG failed to arrive at WAP at the expected time of 1700 hours (local) the

Figure 1: Typical foggy weather condition in the Abardare ranges in June/July season



Figure 2: Typical low clouds at the Aberdares Mountains



1.8 Aids to Navigation

The aircraft had the basic navigational instruments of magnetic compass, RMI and NDB. The flight was VFR, therefore visual ground aids that were in use at the time includes the Aberdare ranges, Mount Kenya. However, their effectiveness at the time of the accident might have been compromised because of the prevailing weather at the time of the accident.

There were no aids to navigation along the route

1.9 Communications

The pilot on takeoff from Lendile wrote a text message to Yellow Wings indicating his estimated time of arrival at WAP with three persons on board. The aircraft was also equipped with VHF. The aircraft was not in contact with the air traffic services at the time of the accident.

1.10 Aerodrome Information

N/A

1.11 Flight Recorders

The aircraft was not equipped with a flight data recorder or a cockpit voice recorder. Neither recorder was required by the civil aviation regulations.

1.12 Wreckage and Impact Information

The accident occurred on the Aberdare Ranges that stretches North to South starting near Mt Kenya and ending at the Great Rift Valley. The Ranges has several high peaks with the highest peak climbing to about 13000 ft. the mountain ranges are approximately ten kilometers in width. They are covered with mountain grass, scattered medium bushes and mountain forests. The ranges have steep valleys and gorges with rivers running from the mountains in to the low land.

According to the radar track from the time the aircraft was first identified on the FIC radar it was generally flying on a course of 180°. The aircraft flew for about 15 minutes under radar coverage before it disappeared from the radar.

The aircraft disappeared from the radar at 1658 hrs. It did not arrive at destination WAP at the estimated time of arrival of 1400z. Non arrival prompted Yellow Wings Air Services to raise concern with WAP tower. The tower tried to contact the aircraft but to no avail. Yellow Wings dispatched a C206 towards the Aberdares to try and raise BUG on VHF radio and any other communication available. This was not successful either. Night fall could not allow further flights on the expected flight path. Yellow Wings set up a search and rescue (SAR) base at their offices where companies and individual members of the flying fraternity joined hands in planning for the best course of action towards (SAR) the following day.

On 26 July 2015 commercial and individual operators volunteered and provided more than six aircraft to resume the search for BUG at the Aberdares from about 9.00am. They spent the better half of the day searching for BUG and did not find the wreckage. The search was hampered by a low cloud, fog and rain showers. The weather was very unfriendly and by afternoon the search could not be continued.

On 27 July 2015 the third day into the search for BUG the search team assembled at Aero Club where there was ample space for the group that had grown bigger. The aircraft could not take off early due to badweather at WAP. The team took off at 11.00 am and searched again for the wreckage with no success. The weather at the Aberdares was still not penetrable on VFR flights. With frustration and defeat in the mind and faces of the search team they assembled again at Aero Club to map out a new strategy. At about 1400 hours KWS dispatched a helicopter that had arrived from Tsavo National Park. KWS had not joined the search team in the previous two days. The pilot took the last known radar coordinates from the FIC and headed for the Aberdares. The pilot found a clear weather at the top of the

Aberdares upto about 8000ft. Below this there were low clouds. After about ten minutes search in the general area of the coordinates that he had been given he found the wreckage on one of the peaks at 12000 ft. He landed at the scene of crash and found that the crew and passengers had been fatally injured. .

The aircraft had collided into the mountain in a forward flight impacting the ground in a level pitch attitude and in powered flight. Impression on the ground indicates that the aircraft impacted the ground and then ballooned up/leapt into the air. The second impact happened some ten meters up the hill where this time the engine plunged into the ground and the fuselage separated from the engine and was flung about fifteen meters to the right of the engine up hill. The wreckage was distributed about 50 meters in a linear direction and some parts were strewn about 20 meters from the main fuselage.

Figure 3: Wreckage Distribution

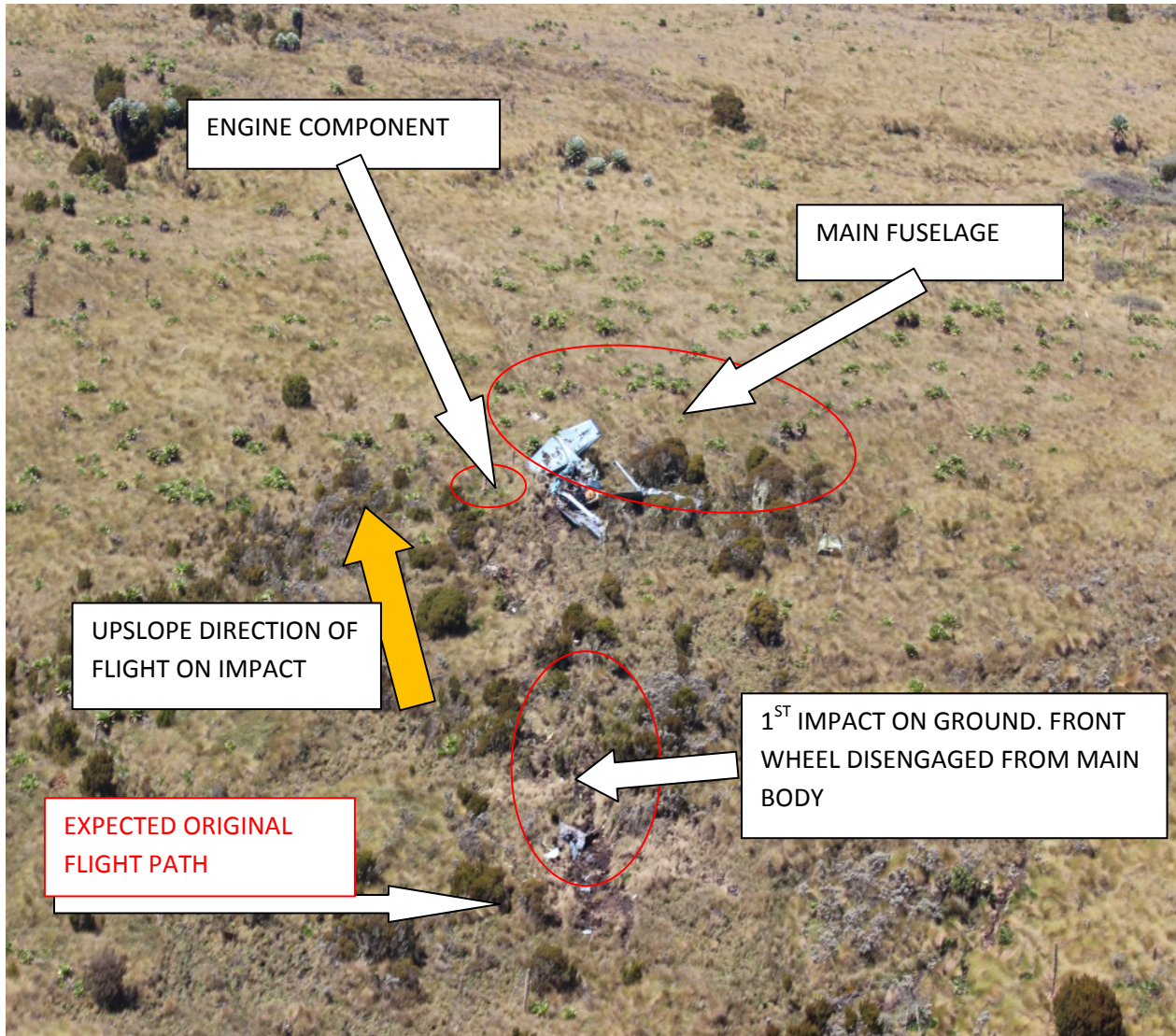


Figure 4: Main Fuselage on Mountain slopes



The aircraft impacted the ground on up slope direction with right wing low. The size of impact impression on ground indicated a powered flight. After the first impact the aircraft ballooned into the air, plunged into the ground with the engine first. The force of impact separated the fuselage from the engine and the fuselage was flung another ten meters upslope and to the right. The cabin and the fuselage weretotally destroyed/mangled. The tail fin (empennage) remained intact. The undercarriage was ruined on impact. The wings were severed from the main fuselage.

Figure 5: Main Fuselage and tail



fin

Figure 6: Main Fuselage and the wings



From available evidence the aircraft was structurally intact before the impact. It was under engine power and in pilot's control. The direction of impact is about 90° from the original track heading towards the top of the peak at the time of first impact

1.13 Medical and Pathological Information

No medical examination of the crew was conducted.

1.14 Fire

There was no evidence of pre or post accident fire resulting from the accident.

1.15 Survival Aspects

brief description of the search and rescue activities. When applicable, include information regarding the serviceability and effectiveness of the emergency locator transmitters At the scene of the accident the pilot was sprawled under the cockpit instrument panel. The victims were found on their respective seats with shoulder harnesses strapped on them. The impact forces caused several fractures to the occupants. When the KWS pilot sighted the wreckage he examined the occupants for any survivors. He found that they had all received fatal injuries. He could not

remove the bodies at that time since he was alone at the scene. He collected lose personal and aircraft luggage and flew back to WAP and reported the finding.

Recovery of the bodies was done the following day.

1.16 Tests and Research

No special test conducted on any aircraft component.

1.17 Organizational and Management Information

1.17.1 Argonaut Limited

Argonaut Limited was incorporated under CAP 486 on 11th April 2001 with two directors. The pilot was one of the Argonaut directors. The company is based at Orly Airpark and owned and operated the fateful aircraft. The aircraft was first registered in Kenya in 18th May 1994.

The company acquired the C206 (5Y-BUG) in November 2012 and it was duly deregistered from the previous owner and registered to Argonaut Ltd on 6th December 2012 under C of R No. 1531-B.

1.17.2. Yellow Wings Air Services Limited

The company is based at Wilson Airport. It is certified as an Air Operator by Kenya Civil Aviation Authority (AOC No.140). Yellow wings Air Services areas of operation are Kenya to and from East Africa; Southern Sudan and Horn of Africa. The company is certified for commercial air transport, passenger and cargo and its fleet includesthe following models of aircrafts, 2 Cessna 208, one Cessna 206, and one Cessna 182. The authorised aircraft at the time of the accident were: C208: 5Y-ELO/YWA, C206: 5Y-CHR, C182: 5Y-BNE. The authorised company pilots were four. The deceased pilot was not a member of the company's flight crew.

The company mainly receives prepaid passengers who book flights through tour agents. On a few occasions passengers may visit the company operations direct when the company may accept direct over the counterpayments.

The company from time to time engages freelance pilots who have been vetted and introduced to the company operating procedures. At other times the company sub contracts any other AOC holder to fly passengers on their behalf. In some occasions the company offered business to the pilot to fly passengers in his aircraft (5Y-BUG) to destinations.

On 25 July 2013 Yellow Wings operations staff called the pilot from Orly Airpark requesting him to fly to Lendille to collect some passengers on behalf of the company. The flight plan was from WAP to Mara pick some passengers and drop them at Nanyuki. Then at 1600 hours pick another set of passengers from Lendille and fly them back to WAP. The pilot accepted the mission and departed Orly Airpark around 1000 hrs.

1.17.3 Aeronav Limited

The company is a limited Company incorporated in Kenya. It had a valid ASL running from 2011 –Nov 2013. She operated commercial air transport passenger and cargo. The company operated scheduled flights from Ukunda Airstrip (South Coast) to Mombasa, Malindi and Masai Mara. She also operated non- scheduled flights and charter from WAP to any other destination in Kenya.

According to records available the company was authorised to operate aircraft C208 registration 5Y-JKN/GSV/MDL and C206 registration 5Y-GDN/HVT. The authorised company pilots were Ndirangu Gichuki (C208), Damien Trousse Sydeles (C208), Munhir Khan (C206), and Peter Chepkwony (C206/208). Both the aircraft 5Y-BUG and the pilot were not authorised to fly commercially under the AOC. However the company accommodated the pilot and his aircraft to operate commercially under the AOC #173. The pilot engaged in commercial flights for businesses sourced by either the company or himself personally.

The company at one time realized that the pilot had attained the age of 65 years. The company advised the pilot that he could no longer engage in commercial flights. The company at this juncture took over all the pilot's commercial flights even when using his aircraft BUG.

The authorised aircraft on the company AOC at the time of the accident were:
C208: 5Y-JKN/GSV/MDL C206: 5Y-GDN/HVT/NII.

The operator's Quality Assurance system had not identified frequent deviations from theregulatory requirements to have all aircraft and pilots authorised to fly under the AOCshuld be officially registered as bona fide equipment and staff of the AOC respectively.

1.18 Additional Information

The pilot owned another C206 aircraft 5Y-HVT (initials of the pilot are HVT). Records available indicate that he operated the aircraft since January 1998. The aircraft was engaged under a particular AOC holder at any one time. AOC holders on record to have certified the pilot's monthly flying hours are: African Sky Charters Limited, U.L.M. (K) Ltd and Aeronav. He would on rare occasions fly different aircraft like C182, C150, C172 and C206 of different registration marks (that is not his). Throughout his flying career, records available indicate that the pilot's flying pattern is commensurate with a commercial engagement other than a private/personal engagement.

The pilot was the chief instructor in parachute jumping in Kenya. He was also the chairman of the Kenya Sky Divers club based at WAP. He would take up the jumpers in either his aircraft 5Y-HVT and on few occasions other aircraft available if his aircraft is not available. Later on when he acquired 5Y-BUG he used to fly it most regularly.

On 28 September 2012 the pilot crash landed on takeoff at Malindi Airport in 5Y-HVT

following engine loss of power. The pilot was taking off with three passengers for a second sortie for parachute jumping drop. Investigation into the loss of power concluded that the pilot did not change the fuel tank selector switch from the tank with low fuel to the tank with adequate fuel.. The aircraft sustained substantial damage and the wreckage was recovered from site..

On 16th October 2012 the pilot entered into a sale agreement to purchase 5Y-BUG a C206. On 26 October 2012 the pilot started flying 5Y-BUG under Aeronav AOC. He continued operating under Aeronav until the time of the accident on 25 July 2013.

The pilot in his flying career had known many interesting and attractive sceneries in the country. At the Aberdares the pilot knew some waterfalls that are very attractive to anyone. According to witness records available and the radar tracks there is a possibility that the victims influenced the pilot to fly them to see the waterfalls in the mountain ranges.

On 20 July 2015 Yellow Wings Air Services flew the victims from Lamu to Lendille. They were to be picked from Lendille to WAP on 25 July 2015. The victims were

under Yellow Wings for flight services while in Kenya. The pilot was to accomplish the mission and then make an invoice to Yellow Wings for payment.

1.19 Useful and Effective Investigative Techniques

The investigation was conducted in accordance with the Air Accident Investigation procedures, and in accordance with the standards and recommended practices of Annex 13 to the Chicago Convention.

2 ANALYSIS

2.1 General

The pilot attained PPL in 1989 at the age of 43 years. He was issued with medical certificate class two commensurate with age and license class. He passed PPL theory examinations marginally. He was tested on aircraft handling or General Flight Test (GFT) and was assessed to have a weakness in approach to landing. The pilot was an average performer as indicated in the PPL and CPL theoretical exams and the initial PPL check ride results. He however gained experience from flying regularly. The pilot acquired high number of flying hours out of engagement in commercial flying. In ordinary circumstances private/personal flying does not accumulate high and frequent flying hours as purported in the records available.

The pilot illegally engaged in commercial flying since 1998 when he acquired CPL. He operated mainly using his aircraft 5Y-HVT and later on 5Y-BUG. There was collaboration between the pilot and some AOC holders who allowed the pilot to attach his aircraft to their AOC for personal gains. The pilot marketed himself to have own customers to fly commercially using the AOC that the aircraft was attached to. At the same time the AOC holder company would use him to fly their customers when they ran short of crew or aircraft. This practice was contrary to the regulations because the pilot was never portrayed as one of the company's pilots

The aircraft 5Y-HVT was officially entered into the list of authorised aircraft for Aeronav. The pilot was however never an authorised pilot in any AOC holding company. He flew unabated in his status. The pilot attained the age of 65 years on 16th September 2011. He was expected to revert and operate under the privileges of PPL only. He continued to renew his medical status for CPL well after the age and neither the AME nor the licensing office at KCAA took the necessary corrective action to stop renewing his CPL.

2.2 Flight operations

The flight originated from Orly airpark. A flight plan was not filed with WAP tower as expected. Yellow Wings flight operations issued verbal instructions on cell phone to the pilot to fly the mission to pick passengers from Mara and drop them at Nanyuki. Thereafter he was to pick another set of passengers (victims) from Lendille to WAP. The pilot took off from Orly airpark and did not file a flight plan with WAP tower.

The pilot communicated to Yellow wings Operations giving information on landing and taking off from destinations on each leg as follows:

- Leg 1: Orly Airpark to Mara
- Leg 2: Mara to Nanyuki
- Leg 3: Nanyuki to Lendille
- Leg 4: Lendille to WAP

Yellow Wings flight operations were expecting 5Y-BUG at 5.00 pm. When the aircraft failed to arrive as expected the personnel on duty inquired from the WAP tower whether the latter had made any communications with the aircraft. After about 20 minutes of the ETA the operations office got concerned and informed the tower the situation as it was with 5Y-BUG. The tower attempted to raise the aircraft but did not get any response. Yellow Wings operations dispatched a pilot in a C206 towards the expected flight path to try and raise 5Y-BUG. This was not successful either. The company established a search and rescue base in their offices and informed other close friends of the pilot who are in aviation industry mainly at Wilson Airport.

Reported weather at the suspected area of disappearance was very unforgiving. More than six aircraft could not find BUG for two days.

2.2.1 Crew qualifications

The pilot was qualified to fly the aircraft as indicated by the documents. He had 4820 hours. The pilot had flown in the country for over 15 years and knew the country side well. He is presumed to have enough aircraft handling and route flying experience. The pilot did not have proficiency checks since 2001. The pilot was never qualified in instrument flying. The pilot was restricted to day VFR flying. **A likely scenario is that the pilot was flying low because of poor visibility in weather. It is likely that there existed some down wash winds as expected with mountainous terrain. The aircraft lost some height in the down wash and the pilot attempted to increase power on the aircraft. From the radar tracking the pilot**

attempted to climb to the mountain ridgeline from the valley below. He did not notice the rising ground and with poor visibility collided with the terrain.

Attach an appropriate graph

2.2.2 Operational procedures

There is no evidence of flight briefing procedure from Yellow Wings to the pilot on the day of the accident. The pilot was informed about the flight on cell phone and he accepted to take the flight as a sub charter. A flight plan with the ATC is not available.

The company could not track the aircraft on the spider tracking system because the aircraft was not fitted with the tracking device installed in other company aircraft. The operations room relied on pilot information on his whereabouts throughout the flight.

2.2.3 Weather

It is likely that the pilot had the intention of showing his passengers some waterfalls in the Aberdares mountains when he encountered bad weather. The weather was not suitable for VFR. The direction of crash was about 90° from the original flight path possibly avoiding poor weather visibility ahead on the original track. The pilot was not instrument rated and on encountering IMC weather en route he tried to look for openings through the clouds.

The weather at the Aberdares during the months of June, July and August is normally characterized by low level clouds, overcast with heavy fog and poor visibility. It is not suitable for VFR flights. This phenomenon is confirmed by the search and rescue team that mobilised more than six aircraft on 26 and 27 July 2013 and could not trace the wreckage because of weather inhibition. There are no weather reporting stations along the route or anywhere on the Aberdare Ranges. This makes VFR flights during the season very unsafe.

On 25 July 2013 the pilot picked passengers from Lendile to fly them back to WAP. The pilot on takeoff informed Yellow Wings of the estimated time of arrival at WAP. The pilot did not take a direct track from Lendile to WAP. Instead he took a flight path that passed through the Western side of the Aberdares. The weather at the Aberdares was minimal for VFR flights and according to impression of impact on the ground it is probable that he was trying to maneuver through some cloud opening. The clouds were very low and heavy fog had developed. Visibility was poor. The pilot did not recognize the rising ground as he changed the flight path.

2.2.4 Air traffic control

WAP tower cleared the aircraft to Nanyuki out of Orly Airpark. Procedurally after zone boundary out the aircraft is handed over to FIC/ACC. FIC then identifies the aircraft through transponder mode S identification code. The radar would pick such identities from certain altitudes depending on geographical location of the aircraft.

FIC picked the identity of BUG at 1631 hours at an altitude of 10800 ft on a heading of 244°. He was on radar for the next 27 minutes and disappeared from the radar at 1658 on a heading of 199° from an altitude of 11700ft. Between the first and the last points of radar identity the aircraft flight path was not under a constant heading. The direction of flight changed from left to right (zigzag manner). This is consistent with weather environment on a VFR flight where the pilot looks for any cloud opening/clearance ahead in a general direction.

2.2.5 Communications

The aircraft was equipped with basic communication equipment/radios. The last Certificate of Release to Service on all avionics and radios was issued on the aircraft on 24 January 2013. The result was “functional checks carried out on all avionics satisfactory”.

2.2.6 Aids to navigation

There were no known aids to navigation en route.

2.3 Aircraft

2.3.1 Aircraft maintenance

Records available indicate that the aircraft was maintained according to the AMOs maintenance procedures. The aircraft does not have any history of maintenance related problems. There was no indication of aircraft performance deterioration. Mass and balance did not play part in the cause of the accident. The aircraft systems and controls were in good operational order. There are no indications of systems failure.

2.4 Human Factors

The pilot was 67 years old at the time of the accident. He was two years above the authorised maximum age of sixty five years to operate commercially on any

license. Above 65 years a pilot is relegated to the privileges of PPL. The pilot continued to operate commercially despite having surpassed the age limit contrary to The Civil Aviation (Personnel Licensing) Regulations, 2013, regulation 15(4) and (5).

2.4.1 Psychological and physiological factors affecting the personnel involved

Prior to the accident the pilot had flown a total of 39.4 hours in the last 90 and 13.55 hours in the last 30 days. Flight time in the last 7 days and last 24 hours could not be established. The flight engagement does not reflect a situation in which the pilot could have accrued fatigue arising from too much flying.

The pilot had flown from around 10.00 am on the first leg. The longest flight of the day according to unrecorded flight plan was between Mara and Nanyuki then followed by the return leg from Lendile to WAP. Each of these legs would have taken one hour to get to destination. The pilot had arrived at Nanyuki at around 12.00 pm. He was to pick passengers from Lendille at 4.00 pm. Nanyuki to Lendille was a 15 minutes flight. Fatigue factor on the part of the pilot may not have had effect during the flight. However the body physiology could have experienced fatigue when encountered by poor weather en route.

2.5 Survivability

2.5.1 Rescue fire service response

There was no evidence of pre or post accident fire. The accident site was however on a mountainous location that even access for fire service response would have been a challenge.

2.5.2 Analysis of injuries and fatalities

The pilot and passengers had multiple injuries and fractures.

2.5.3 Survival aspects

Following the injuries received by the occupants and the weather conditions at the mountain ranges the chances of survival in the number of days taken before the wreckage was discovered were minimal.

3 CONCLUSIONS

3.1 Findings

1. CREW/PILOT

- The pilot did not hold a valid CPL license contrary to existing regulations.
- The pilot's experience was high but the competency level was questionable
- The pilot was flying under Medical Class II validity. He did not have a medical Class I certificate as required by regulations for commercial flights
- The pilot's age was 67 years. This was 2 years above the authorised maximum age to hold and practice the privileges of CPL contrary to regulations.
- The pilot operated commercial flights illegally for a long time
- The pilot's rest and duty time requirements were considered to be adequate.
- The aircraft was not certified for instrument flying and the pilot was not qualified for IFR flight.
- There was insufficient evidence to determine if the pilot's degraded performance in the early days of training contributed to the accident.
- Age factor compounded with poor weather were considered to have reduced the pilot's alertness levels
- The pilot's attention may have been distracted by the passengers' quest to view the waterfalls at the mountains.
- There was no evidence of pilot's performing the necessary preflight procedures and filing of the flight plan
- The pilot lost situational awareness at a time of high crew workload
- The pilot had another accident in September 2012 in which he did not change the fuel selector knob to the tank with adequate fuel on takeoff and the aircraft experienced fuel starvation occasioning engine loss of power.

2. AIRCRAFT

- The maintenance records indicated that the aircraft was certified, equipped and maintained in accordance with existing regulations and approved procedures.
- The aircraft had a valid Certificate of Airworthiness and had been maintained in compliance with the regulations.
- The aircraft was airworthy when dispatched for the flight.
- The mass and the centre of gravity of the aircraft were within the prescribed limits.
- There was no evidence of any defect or malfunction in the aircraft that could have contributed to the accident.
- There was no evidence of airframe failure or system malfunction prior to the accident.
- The aircraft was structurally intact prior to impact.
- All damage to the aircraft was attributable to the severe impact forces.
- Due to the destruction of the aircraft by the impact, it could not be determined whether any pre-impact failure or system malfunction contributed to this accident.

- The destruction of the aircraft by impact precluded determination of any material failure or system malfunction.
- Propeller blade damage and twist was consistent with the engine producing power at impact.
- The propeller(s) exhibited chord-wise scratching and torsional damage indicative of the engine producing power on impact.

3. FLIGHT OPERATIONS

- The flight was not conducted in accordance with the procedures in any of the company Operations Manual.
- The pilot attempted to continue visual flight in instrument meteorological conditions.
- ** During flight in mountainous environment there exists a possibility of downward wind gust that may have pushed the aircraft low. The mountainous winds demanded more power input on aircraft performance.
- ** During the climb from the low altitudes the pilot failed to realize the rising ground as the aircraft climbed towards the mountain top.
- The aircraft impacted the ground in a powered flight with the nose wheel first. It seems to have somersaulted hitting the ground upside down. The impact crumpled the fuselage and the engine was separated from the body and flung about 5 meters away.

4. OPERATOR

- One AOC holder subcontracted the pilot to conduct a commercial flight on her behalf.
- A second operator purported that the pilot and the aircraft were legally in the AOC.
- The AOC holder allowed operations of the aircraft for commercial purposes under the AOC illegally.
- The pilot was not authorised to fly under the AOC contrary to regulations.
- The pilot did not comply with the company's Standard Operating Procedure for encountering bad weather during flight.
- The operator's Quality Assurance system had not identified the requirements to have the aircraft and the pilot authorised to be in the AOC.

5. SURVIVABILITY

- The accident was not survivable due to severity of damage and crumpling of the fuselage after impact
- The occupants succumbed to the effects of injuries sustained and exposure to unfavorable weather conditions before they could be sited and rescued.
- It was not established how long the occupants remained alive after the accident before succumbing to injuries due to lack of expedient search and rescue to save the occupants.

6. MEDICAL

****to get post mortem report**

7. SAFETY OVERSIGHT

— The civil aviation authority's safety oversight of the operator's procedures and operations was inadequate.

— The civil aviation authority's safety oversight programme had not addressed frequent checks against the AOC's authorised aircraft and pilots.

— The civil aviation authority's monitoring system had been ineffective in identifying and making the operator correct the procedural lapses.

- The civil aviation authority's licensing department checklist does not address maximum age that goes with different license privileges.

- The Civil aviation authority's safety oversight programme was ineffective in monitoring proficiency and competency levels of pilots especially those under general aviation (private).

3.2 Causes

The possible causes of the accident is failure to maintain terrain clearance that led to controlled flight into terrain:

Contributing factors:

- Improper licensing of pilot
- Pilot lacked inadequate experience and certification for type operation
- Pilot not qualified for type operation
- Operator improper approval of pilot
- Flight operational procedures including dispatch not followed
- Pilot operating in VFR while in IMC and not instrument rated
- A probable cause of the accident was failure to realize rising ground and aircraft corresponding power requirement to climb the mountain slope.
- Failure to maintain terrain clearance on mountain environment with reduced visual lookout led to controlled flight into terrain.

4 SAFETY RECOMMENDATIONS

1. KCAA to set up a reliable mechanism of monitoring pilot's age.

2. KCAA to develop a policy on the appropriate action or measures to be taken on a pilot involved in an aircraft occurrence before resumption of flight duties.
3. CAA to develop policy on general aviation safety oversight on regular training and competency checks on all pilots.
4. KCAA to adhere to laid down requirements of Licensing of pilots.
5. Aviation Medical Examiners AME should comply with regulatory requirements when issuing medical certificates to pilots and all other categories that are required to have them.