AVIATION ACCIDENT INVESTIGATION REPORT

CRASH AFTER TAKE-OFF

PRIVATE FLIGHT

UNIVAIR AIRCRAFT CORPORATION (FORMERLY ENGINEERING & RESEARCH CORPORATION) (ERCO) 415-C

UNITED STATES REGISTRATION N3254B

HAMPSTEAD, ST. MARY, JAMAICA

05 MAY 2023

REPORT NUMBER JA-2023-01

Investigation conducted by the Jamaica Civil Aviation Authority (JCAA).

Accredited Representative: The National Transportation Safety Board of the United States of America (NTSB).

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.

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ABBREVIATIONS

AAJ	Airports Authority of Jamaica
A/C	Aircraft
AD	Airworthiness Directive
ARFFS	Airport Rescue and Fire Fighting Services
ASD	Air Situational Display
ATS	Air Traffic Services
AVGAS	Aviation Gasoline
BTDC	Below Top Dead Center
CARs	Civil Aviation Regulations
ELT	Emergency Location Transmitter
ICAO	International Civil Aviation Organization
JCAA	Jamaica Civil Aviation Authority
JCF	Jamaica Constabulary Force
JDF	Jamaica Defence Force
JFB	Jamaica Fire Brigade
KATCC	Kingston Air Traffic Control Centre
FAA	Federal Aviation Administration
FSAM	Flight Safety Administration Manual
IT	Information Technology
L/H	Left Hand
MCTOW	Maximum Certificated Take-off Weight
MKBS	Ian Fleming International Airport (ICAO Designator)
MKJP	Norman Manley International Airport (ICAO Designator)
MKTP	Tinson Pen Aerodrome (ICAO Designator)
R/H	Right Hand
SARPS	Standards and Recommended Practices
STC	Supplemental Type Certificate
TT	Total Time

1.0 FACTUAL INFORMATION

1.1 History of the flight

On May 5, 2023, a Univair Aircraft Corporation (formerly Engineering & Research Corporation) aircraft, model (ERCO) 415-C, Registration N3254B operated privately, departed Tinson Pen Aerodrome (MKTP) runway 32 at 14:00 UTC (09:00am local) with two souls aboard for a 20-minute VFR flight to Ian Fleming International Airport (MKBS) at a reported altitude of 2000 feet mean sea level (MSL). The passenger was secured using a four-point harness, the pilot was only wearing a lap seat belt. Reported Meteorological Report (METAR) at the time showed the wind was at 260 degrees at 5 knots, with greater than 10 kilometers visibility, few clouds at 2200 ft. MSL, temperature 30 degrees Celsius and mean sea pressure level (QNH) 1015mb (MKTP 1014mb). At 14:03:20 UTC MKTP Tower advised N3254B to contact Manley Radar at frequency 120.6 MHz. N3254B contacted Manley Radar at 14:07:39 UTC and was positively identified at an altitude of 1500ft MSL, eight (8) nautical miles north of Norman Manley International Airport (MKJP) (in the vicinity of Stony Hill). At 14:12:40 UTC Manley Radar advised N3254B to switch to Unicom Frequency 122.8 MHz. At that time the aircraft was at an altitude of 2100ft, approximately 14 nautical miles north of MKJP. Radar contact was lost at 14:13:35 UTC, approximately 15.5 nautical miles north of MKJP and 1.3 nautical miles west of Castleton Botanical Gardens. No further transmission was made from the aircraft. While enroute to MKBS, the engine started to run rough, shut off, but was quickly restarted for a short time and then shut off again, after numerous attempts the pilot was unable to restart the engine.

The aircraft subsequently impacted terrain in an area called Hampstead, St. Mary. The approximate coordinates were $18^0$18’48.90” N $76^0$54’5.89” W at an altitude of 373ft MSL.

1.2 Injuries to Persons

Table 1. Injury Chart.

Injuries	Flight Crew	Flight Attendants	Passengers	Other	Total
Fatal	1				1
Serious			1		1
Minor/None					
Total	1		1		2

1.3 Damage to Aircraft

The aircraft was substantially damaged from impact with trees and the ground.

1.4 Other Damage

There was no damage sustained to any building, vehicle, navigational facility or aerodrome structures and installations and any significant damage to the environment.

1.5 Personnel Information

The Pilot's Federal Aviation Administration (FAA) records contained the following:

- FAA Commercial Certificate No. 2205746 endorsed for:
  Airplane Multiengine Land
  Airplane Single Engine Land
  Rotorcraft -Helicopter
  Instrument Airplane
- Last Medical: 15th February 2000.
- Second Class Medical
- Medical was Valid to February 28, 2001.
- FAA Mechanic Certificate No. 2383938 endorsed for:
  Airframe
  Powerplant

The Pilot held an FAA Commercial Pilot Licence. However, the Licence was not valid at the time of the accident as he did not hold a current medical.

The Pilot's JCAA records contained the following:

- JCAA Commercial Certificate No. CL00000306 endorsed for:
  Single Pilot non-high-performance, Single engine & Multi-Engine Land aircraft of 5700kg or less MCTOW which was issued on 21st September 1983.
- The Pilots Last Medical was done on May 18th, 2009, and was valid to 30th November 2009.
- JCAA AME Licence No. ME00000178 valid to January 13, 2025, and endorsed for:
  M1/M2
  Types: (1) All piston engine aeroplanes of 5700kg or less MCTOW
  (2) MU2 X
  (3) Direct Reading Compass compensation & adjustment
  (4) SS2T

The Pilot held a JCAA Commercial Pilot Licence. However, the Licence was not valid at the time of the accident as he did not hold a current medical.

The air traffic service personnel that provided air traffic services to the pilot of N3254B were in possession of valid air traffic control licenses, permits and medical certificates and were appropriately rated to provide the service in their respective units according to the licensing requirements of the Civil Aviation Regulations (CARs) 2012. The training record for the Unit Manager who was acting as the Unit Supervisor did not have any record of supervisory training or recurrent training in normal and emergency procedures as required by the CARs.

The maintenance personnel who certified the 100hr and annual inspection were appropriately certified by Federal Aviation Administration.

1.6 Aircraft information

The Aircraft was manufactured by Engineering & Research Corporation (now Univair Aircraft Corporation) on April 4, 1946, it was a Model (ERCO) 415-C, with Serial No. 1018. The Aircraft Specification Number is A-718.

The Certificate of Registration was issued on June 30, 2020, with an expiration date of June 30, 2027, to Beek Dudley E. with registration markings N3254B.

The Certificate of Airworthiness for the aircraft was issued on July 20, 1956, in the Normal Category.

The last scheduled inspection conducted on the aircraft was an Annual Inspection which was accomplished on December 1, 2022, at Aircraft (A/C) Total Time (TT) 1115.9 hours, Engine TT 2,870.88 hours, with an Engine Time Since Overhaul (TSOH) of 172.9 hours.

On May 12, 2023, the maintenance records were collected from the owner's son who delivered them to the office of the Authority.

The ERCOUPE is a two-place, low wing monoplane of metal construction. Power is supplied by a 100 horsepower Continental 0-200-A engine. Ease of ground handling is assured by the steerable nose wheel, excellent vision, and brakes. Simplicity of the flight has been achieved by eliminating the rudder pedals. Only the control wheel is used. Ailerons, rudders, and nose wheel are mechanically coordinated so that turns, both in the air and on the ground, are made by turning the control wheel right and left; the same wheel moved fore and aft controls the elevator. The ERCOUPE is certified by the Civil Aeronautics Administration as "characteristically" incapable of spinning.

1.6.1 Engine

The engine fitted to the aircraft was manufactured by Continental under Production Certificate 3 as a Model O-200-A and certified under Type Certificate E-252. Engine Serial Number 3654-2-A was manufactured as new on November 28, 1962. The engine records indicate that it was removed from a Cessna 150, registration N20152. The engine was subsequently overhauled on June 11, 2003, and installed on N3254B on December 1, 2003, A/C TT 943.0 hours, in accordance with FAA Supplemental Type Certificate (STC) No. SA2628WE. However, it is noted that an airframe entry was made on May 10, 2019, which refers to a FAA Field Approval for the engine installation per FAA Form 337, dated May 10, 2019, as STC No. SA2628WE applied to ERCOUPE model 415D only. The engine time run since installation on the aircraft was approximately 172.9 hours. The engine TT since new 2870.88 hours. The engine manufacturer's recommended time between overhaul (TBO) is 1800 hours or 12 years.

1.6.2 Propeller

The propeller fitted to the aircraft was manufactured by McCauley under Production Certificate No. 3 as Model 1A101DCM and certified under Type Certificate P-918, propeller Serial Number G9225. The propeller records show that it was fitted to the aircraft on December 1, 2003. The propeller time at fitment was unable to be determined. The time since the last propeller overhaul or calendar time since last propeller overhaul could not be ascertained from the records provided. The propeller manufacturer's recommended time between overhaul (TBO) is 2000 hours or 72 calendar months whichever comes first.

1.6.3 Fuel

The STC No. SA2628WE for the installation of Continental O-200-A engine, McCauley 1A101-DCM 6948 propeller and electric fuel transfer pump, states the fuel as: 80/87 Minimum Grade Aviation Gasoline.

The aircraft fuel system consists of two (2) wing tanks with a nine-gallon capacity each, that feed a fuselage header tank with a six-gallon capacity located aft of the firewall forward of the instrument panel. The header tank gravity feeds to the engine and is continually replenished from the wing tanks via a closed loop system powered by a firewall mounted electric fuel transfer pump. When the fuel in the wing tanks is exhausted the header tank continues to gravity feed the engine until it is empty.

There is no column for recording fuel uplift in the aircraft flight logbook, which was retrieved from the aircraft, however the pilot reported 3 hours of fuel to ATC personnel on the date of the accident. The passenger recalled seeing the fuel gauge, which is located on the right side of the cockpit at the halfway mark at MKTP prior to take off.

The fuel tank filler cap assembly for the header tank was not found at the accident site and it has not been located, also, it was observed that there was no fuel in the header tank on the initial site visit, the tank was found to be deformed and punctured. The fuel pump transfer pump warning light on the aircraft instrument panel was not illuminated at the time of the initial site visit, and the fuel pump switch was observed to be in the off position. There was evidence of residual fuel in the output line of the electric fuel pump.

A sample of fuel was removed from the right wing of the aircraft at the accident site and was sent for testing, it appeared to be yellow in colour. Approximately eight (8) gallons of fuel were drained from both wing tanks of the aircraft at the accident site. No fuel was retrieved from the header tank. The placard located at the wing fuel tank filler caps stated "*100/110 low lead***".**

On the day prior to the accident, the pilot was observed refueling the aircraft in his hangar from a red jerry can.

Investigators met with representatives of aircraft fuelers, Jamaica Refueling Services Limited (JARS) located at Tinson Pen Aerodrome & Ian Flemming International Airport,

to obtain fuel samples for testing, however both advised that they were never called upon to fuel the accident aircraft.

1.6.4 Maintenance Program

The 100hr & Annual Inspections were performed in accordance with the ERCO Service Manual & Service Bulletins.

1.6.5 Airworthiness Directives

The aircraft records indicated that all applicable FAA Airframe, Engine & Propeller ADs were complied with.

There was no entry found in the aircraft records that demonstrated compliance with FAA Accessory AD 98-01-06, with an effective date of February 13, 1998, applicable to Carburetor Model MA-3SPA fitted to the engine.

1.6.6 Shoulder Harness

The aircraft was fitted with Aero Fabricators Shoulder Harness, Model No.H-702-200, an FAA PMA Part, on November 1, 2021, at A/C TT 1110.9, in accordance with FAA Policy Statement Number ACE 00-23.561-01.

1.6.7 Defects

There was an entry in the "**Destination/Purpose**" column of the aircraft flight log on the date that corresponds to June 1, 2022, which states "***starter***". An entry was found in the engine logbook dated December 1, 2022, which stated that a serviceable starter clutch was installed.

There was an entry in the "**Destination/Purpose**" column of the aircraft flight log on the date that corresponds with August 12, 2022, which states "***fuel leak***". There was no corresponding entry found in the airframe or engine logbooks detailing the rectification of this item.

In the "**Squawks/Inspections**" column of the aircraft flight log on the date that corresponds to August 15, 2022, had an entry which stated, "***oil pressure gauge***" & "***fuel line***", It also said "***Oil P = 35 wer***". There was no corresponding entry found in the airframe or engine logbooks detailing the rectification of this item.

1.6.8 Aircraft Load

The maximum weight listed in the Aircraft Specification for Normal category is 1260 lbs. However, documents were found in the aircraft records that suggested that FAA STC No. SA02450CH may have been incorporated into the aircraft. If incorporated, this would increase the aircraft gross weight by 60 lbs., from 1260 lbs. to 1320 lbs. maximum weight. However, this could not be confirmed, as there was no entry seen in the airframe logbook nor was any FAA Form 337 for this modification found in the aircraft records or the records for the aircraft held at the FAA Aircraft Registry.

The C.G. Range per FAA STC No. SA2628WE is:

(+26.8) to (+30.4)

Two aircraft Weight Reports were seen in the aircraft records, one dated May 13, 2019, as set out in Appendix 1, which was certified. The other Weight Report was dated January 2022, however, this was not certified, as set out in Appendix 2. Weight and balance sheets were prepared for both aircraft empty weight scenarios as set out in Appendix 3. If FAA STC No. SA02450CH was embodied, the aircraft would be within weight and balance limits. If not, the aircraft would have been 127 lbs. overweight, but would fall within the center of gravity limits.

Note: The aircraft empty weight in the Weight Report dated May 13, 2019, was 977 lbs., the aircraft empty weight set in the Weight Report dated January 2022 was 892 lbs. There was nothing seen in the aircraft records that would have accounted for an 85 lb. reduction in aircraft empty weight.

Note: The Continental O-200-A engine does not meet the airframe qualification criteria as set out in Section 3.0 of the Installation and Maintenance Manual Number 415-1320STC for the application of FAA STC No. SA02450CH.

1.6.9 Aircraft Records

An entry in the airframe logbook dated November 1, 2021, indicates that a 9 cubic foot baggage compartment was installed in accordance with FAA STC No. SA330GL, a battery master solenoid was installed in accordance with FAA STC No. SA02601CH, and an improved fuel gascolater assembly was installed in accordance with FAA STC No. SA01026SE. However, no FAA Form 337's was seen in the aircraft records for these modifications, nor were any found in the records for the aircraft in the FAA Aircraft Registry.

1.7 Meteorological information

No meteorological office or meteorological personnel is located at the IFIA. Meteorological information is obtained from an automatic weather station maintained by the Meteorological Service of Jamaica and broadcasted via an Automatic Terminal Information System (ATIS) frequency 127.75 MHz. Pilots operating to and from IFIA are expected to obtain weather information by selecting the frequency. The Meteorological report issued at 1400 UTC on May 5, 2023, was based on information obtained from the ATIS and reads as follows:

"METAR MKBS051400Z AUTO 10005KT 030V170 9999 BKN026///31/24 Q1016="
The report indicated that the wind at IFIA was from the east, 100 degrees true, variable between 30 degrees and 170 degrees, at five knots. The visibility was recorded to be greater than 10 Kilometers while clouds were broken at 2600 feet. The air temperature recorded was 31 degrees Celsius and Dew Point was 24 degrees Celsius. The air pressure recorded was 1016 Hectopascals.

1.8 Aids to Navigation

Based on the location of the accident, the aircraft was not being flown with reference to any air navigation facility. The aircraft was initially under Radar surveillance provided by the Kingston Air Traffic Control Centre (KATCC) but according to the transcript of air traffic control recording, Radar service was terminated at 14:13:35 UTC.

1.8.1 Global Positioning System

The aircraft was equipped with a portable Garmin GPS, model: GPSmap 496 which was removed and sent to the National Transport Safety Board (NTSB) Headquarters in Washington DC for the data to be downloaded and analysed. The unit was serviceable; however, it was not in use for the flight on the date of the accident.

1.9 Communications

On the day of the accident, there was no reported unserviceability of any aeronautical mobile or aeronautical fixed service communications systems.

Because IFIA is an uncontrolled aerodrome[1], all pilots are required to broadcast their intention on UNICOM 122.8 MHz frequency while operating in the IFIA Traffic Information Zone and maintain a listening watch on 120.6 MHz frequency. The IFIA Traffic Information Zone is located within 15 nautical miles of the IFIA aerodrome reference point. The broadcast shall include position reports at York Castle, Albion, Port Maria, Llandovery and Moneague. The UNICOM frequency is not recorded; hence, no information is available on the serviceability of the frequency at the time of the accident. The 120.6 MHz frequency was serviceable at the time of the accident based on information obtained from transcript of the air traffic control recording.

1.10 Aerodrome Information

1.10.1 Aerodrome of Departure

The flight departed the Tinson Pen Aerodrome, a public domestic aerodrome, located on Marcus Garvey Drive in the parish of St. Andrew, approximately 2.1 miles northwest of the city centre, and represented by the ICAO four letter indicator MKTP. It is situated approximately 2.1 nautical miles from the city centre with its reference point located at N17^0 59" 19', W076^0 49" 26' (WGS 84)[2]. The aerodrome is an uncontrolled aerodrome for visual flight rules (VFR) operations only and open daily from 7:00am – 7:00pm. Tinson Pen Aerodrome has a paved runway made of asphalt and has a runway dimension of 1319 meters in length and 30 metres in width and designated 14/32.

1.10.2 Destination Aerodrome

The destination of the flight was the Ian Flemming International Airport (IFIA). This is an uncontrolled public aerodrome located approximately 9 KM from the nearest town, Port Maria and is represented by the ICAO four-letter indicator MKBS. IFIA has a paved runway made of asphalt and concrete with a length of 1453 meters and 30 meters in width

[1] Uncontrolled aerodrome - an aerodrome with a control tower
[2] World Geodetic System

and designated 09/18. The aerodrome reference point is located at N18^0 24" 15', W076^0 58" 09' (WGS 84). The airport operates daily between 7:00am – 7:00pm with prior permission required for operations outside these hours. The aerodrome accepts both instrument flight rules (IFR) and VFR operations.

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 relevant aviation regulations.

1.12 Wreckage and Impact Information

The aircraft came to rest in a nose down, near vertical position as seen in Figure 1; all four corners of the aircraft were observed at the crash site. The engine and propeller were attached to the airplane.

Figure 1

Position of Aircraft on Impact

The wreckage distribution was largely confined to the immediate ground impact site. The nose section and forward cabin area were crushed and displaced rearward along the airplane's longitudinal axis.

The nose cone of the propeller was crushed, and both blades were bent aft ward as seen in Figure 2. There was no evidence of scoring on the leading edge of the propeller blades. The propeller was securely attached to the engine and the bolts were secured with locking wire.

Figure 2

Aircraft Propeller and Engine

The engine cowling was partially attached to the aircraft as seen in Figure 3. The lower engine cowl was badly deformed and there was no evidence of fire damage in the engine compartment. The engine was partially attached to the firewall, and the engine mount rods were deformed. Engine control continuity was established.

Figure 3

Engine Compartment

The propeller was securely attached to the forward section of the engine crankshaft, all attach bolts were in place and securely attached by lock wire, see figure 4. It was observed that the forward section of the crankshaft was bent, see figure 5.

Figure 4

Figure 5

All four cylinders were firmly attached to the crankcase, and all eight spark plugs were installed in the cylinders with their leads attached. Both magnetos and the starter were securely attached to the accessory gearbox, as seen in Figure 6.

Figure 6

The engine firewall was deformed and displaced rearward along the airplane's longitudinal axis, the electric fuel transfer pump was securely attached to the right forward side of the firewall. The upper and lower fuselage of the aircraft just aft of the firewall was crushed and the windshield was shattered in multiple areas, see Figure 7.

Figure 7

The engine mount was deformed; and the attachment points to the firewall were badly damaged and partially separated. The mount was securely attached to the engine crankcase.

The header fuel tank located between the firewall and the aircraft instrument panel was observed to be deformed.

The aircraft instrument panel was slightly deformed but still intact, the glass for the Engine RPM Gauge was broken see Figures 8 & 9.

Figure 8

Figure 9

The seat back and cushion assemblies were found to be securely attached in the aircraft cabin. Both shoulder harnesses and seat belts were also securely attached. The left and right cabin window assemblies were both operational and the aft cabin windows were both intact. The cabin floor was intact, and the control column and shaft assembly were observed

to be in place. The pilot's control yoke was bent forward, and the shaft was sheared at the control column end.

The aft fuselage and the tail cone assembly were intact, the control mast support and flight control cable runs were securely installed, no sign of damage was observed in these areas. The stabilizer assembly was securely attached to the empennage of the aircraft. The elevator assembly along with both fin assemblies were securely attached to the stabilizer assembly. Both rudder assembles were securely attached to the fin assemblies as seen in Figure 10. Flight control surface continuity was established for the elevator, rudders, and elevator trim tab.

Figure 10

The right wing was securely attached to the center section assembly as seen in Figure 11 & 12. There was a cut approximately 13 ½ inches deep and 27 ½ inches wide along the leading-edge skin of the wing from the beam splice outer nose rib to the 8th rib of the intermediate nose. There were also various areas along the leading-edge skin and tip skin which have indentation damage. The right aileron assembly was securely attached to the rear wing beam assembly at the four hinge assemblies. The control mast to aileron bellcrank pushrod assembly was bent. Flight control surface continuity was established for the aileron. The right navigation light at the wing tip was damaged, the lens and bulb were missing.

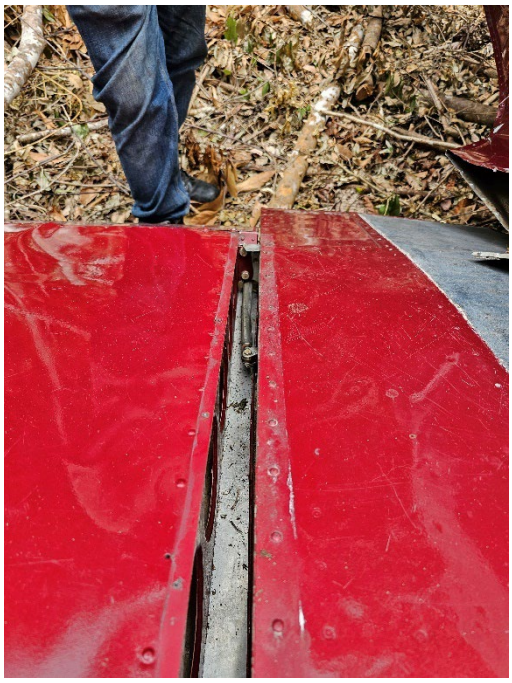

Figure 11

Figure 12

The left wing was securely attached to the center section assembly as seen in Figure 13. The skin at the wing root is separated at the lap joint. There was a cut approximately 14 inches deep and 12 inches wide along the leading-edge skin of the wing at the 6th rib of the intermediate nose. There was also a 4-inch-deep indentation damage of the leading-edge skin at the rib beam splice outer nose and various indentations along the leading edge of the wing tip skin assembly. The left aileron assembly was securely attached to the rear wing beam assembly at the four hinge assemblies, there was minor damage to the upper inboard section of the aileron. Flight control surface continuity was established for the aileron. The pitot tube assembly located at the lower left wing was securely attached with no sign of damage.

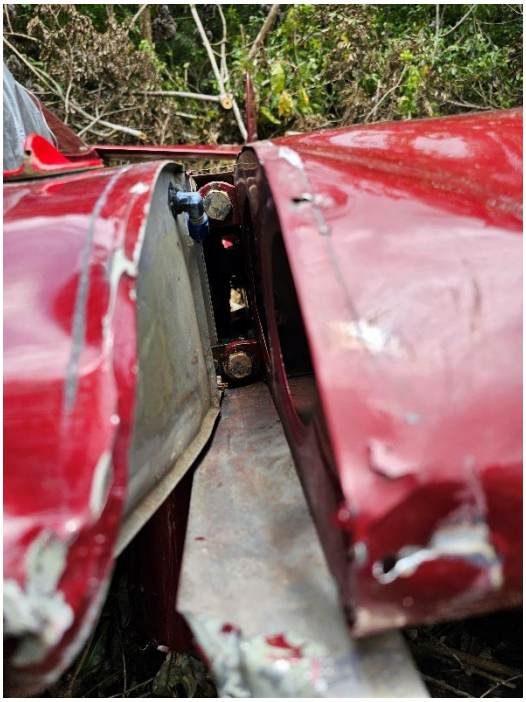

Figure 13

The Nose Landing Gear (NLG) was attached to the engine firewall which was displaced rearward. The torque link was attached, the strut was inflated as well as the tyre, see Figure 14. The control column to nose gear pushrod was broken at the NLG attachment, see Figure 15.

Figure 14

Figure 15

The left and right Main Landing Gears (MLG) were securely attached to the front beam of the Center Section. The torque links were attached, the struts were inflated as well as the tyres, see Figure 16 for the L/H MLG and Figure 17 for the R/H MLG.

Figure 16

Figure 17

1.13 Medical and Pathological Information

An autopsy was performed on the Pilot on May 22, 2023, by a Consultant Forensic Pathologist of the Legal Medicine Unit in the Ministry of National Security. The cause of death was determined to be blunt force trauma due to aircraft collision with the ground.

The Institute of Forensic Science & Legal Medicine performed toxicological tests of the blood samples taken from the pilot. Evidence of Metoprolol[3], Clopidogrel[4] and Losartan[5] as well as Caffeine[6] were found in the samples. These agents were unlikely to have had any effect on his ability to function or control the aircraft.

1.14 Fire

There was no evidence or report of fire at the accident site.

1.15 Survival Aspects

1.15.1 Ian Fleming International Airport

The Emergency Response Plan of IFIA indicated that IFIA would respond to aircraft accidents on airport, that is, within the perimeter fence of the airport and "off airport" that is, within 5 KM radius beyond the perimeter fence of the airport. On the day in question, the Safety & Security Officer at IFIA received information at 14:29 UTC, from an eyewitness that an aircraft had gone down over the community of Nonsuch, Tremolsworth,

[3] An antihypertensive agent
[4] An antiplatelet agent
[5] An antihypertensive agent
[6] A component of coffee

St. Mary. Further, a Port Security Corp Officer assigned to IFIA informed the Safety and Security Officer that he spoke with the occupants of the aircraft, and they confirmed the initial report that the aircraft had crashed.

The Safety & Security Officer at IFIA contacted the Kingston Air Traffic Control Centre (KATCC) at 14:31 UTC and relayed the information. According to the report, the Unit Manager was not aware of the accident and informed the caller that he would activate the relevant search and rescue procedures. The Safety & Security Officer also informed IFIA's watch room attendant.

Although the accident occurred well outside the 5KM radius of the airport, the IFIA team activated their emergency response procedures by alerting the responding agencies, to include the KATCC, the Airport Protection Services watch room attendant, the Jamaica Defence Force (JDF), the Jamaica Fire Brigade (JFB) and the Jamaica Constabulary Force (JCF). In addition, although not required, the IFIA Safety & Security Officer along with the acting Rescue and Emergency Services Officer made their way to the presumed location of the site of the aircraft accident.

1.15.2 Kingston Air Traffic Control Centre

The KATCC was alerted to the aircraft accident at 14:32 UTC by the Safety & Security Officer at IFIA. In keeping with the procedures described in Part 4 Section 2103.21 of the ATS Manual of Operations 3rd Edition, Errata Version, the Unit Manager alerted the JCF and attempted to contact the JDF which is the Rescue Coordination Centre (RCC) for Jamaica; however, the numbers were busy. The supervisor's report indicated that the Flight Information Officer (FIO) at the Tinson Pen Aerodrome had contacted the JDF.

1.15.3 Jamaica Defence Force

The JDF was informed of the aircraft accident at 14:42 UTC by the FIO at the Tinson Pen Aerodrome. The search and rescue helicopter departed the base at 15:17 UTC and it took approximately 14 minutes to arrive at the presumed location of the accident. Another 15 minutes elapsed before the downed aircraft was observed in another location in proximity to the original location provided. The rescue operation was activated, and the occupants of the accident aircraft were airlifted to the University Hospital of the West Indies. The accident victims arrived at the hospital at 16:32 UTC and were admitted to the accident and emergency department.

1.15.4 Jamaica Fire Brigade

The Port Maria Fire Station received the call on the aircraft accident at 14:51 UTC. The team responded with Fire Unit 5-25 from Port Maria Fire Station and Fire Unit 5-30 from Annotto Bay Fire Station. The Port Maria Fire Station notified the JCF, Ministry of Health, and the St. Mary Disaster Coordinator in keeping with their callout procedure.

The Port Maria Fire Crew were the first to arrive at the stated location at 15:06 UTC. The visibility of the area was impacted by dense vegetation. The JFB crew proceeded on foot in search of the downed aircraft and its occupants.

The search party was also joined by members of the Annotto Bay Fire Station and the JCF at approximately 15:25 UTC and members from the JDF at 15:52 UTC.

The Fire Brigade received information at 16:50 UTC that the JDF Air Wing had located the aircraft at a section called Ballard's Valley and that the two occupants were being airlifted to the University Hospital of the West Indies.

The search team left the area where they were and made their way to the new location. As this was no longer a rescue mission, firefighters from the Annotto Bay Fire Station returned to their base while the Port Maria team assessed the aircraft that was now being guarded by members of the JCF. The assessment of the aircraft by the JFB indicated that there was no fire and no threat to life and property. The JFB, therefore, retreated from the scene and returned to their base.

1.15.5 Jamaica Constabulary Force

Members of the JCF arrived at the location at 15:25 UTC and joined the search. Once the aircraft was located, they secured the location until the arrival of the response team of the JCAA.

1.15.6 Emergency Locator Transmitter

The aircraft was fitted with an Ameri-King Corp, Model: AK-450 Type ELT-(AF) (AP), with S/N 469028 and a battery replacement date of August 2023, the unit was found in the armed position. It was observed on the initial accident site visit that the ELT light on the instrument panel was illuminated, however there was no report of a signal being received by any of the ATC Centres or the JDF, the agency designated to monitor ELT transmissions.

1.16 Tests and Research

1.16.1 Engine Teardown Examination

A teardown examination of the Continental engine, Model: 0-200A, Serial No. 3654-2-A, was conducted at Continental Aerospace Engine's facility in Mobile, Alabama, USA on February 27-28, 2024, in the presence of the NTSB & Continental Aerospace Investigators.

The JCAA AWI Investigator was not present at this event as is customary for accidents of this nature, because approval for travel from the Ministry responsible for Transport was not forthcoming even though the request for travel was made by the Investigator In Charge and approved by the Director General, JCAA on January 9, 2024, several weeks in advance of the proposed date of the engine examination.

The airframe components returned with the engine included portions of the exhaust system, airframe cooling baffles, airbox and filter, airframe gascolater and the oil filter adaptor.

Exhaust System

The exhaust system was damaged by the impact and only the runners were returned.

Figure 18

Figure 19

Induction System

The induction system was intact and exhibited impact damage. See Figures 20 & 21

Figure 20

Figure 21

Ignition System

The magneto-to-engine timing specification for this engine is 24^0 Before Top Dead Center (BTDC). The magneto-to-engine timing for the left magneto was found to be set at 26^0 BDTC. The magneto-to-engine timing for the right magneto was found to be set at 26^0 BTDC.

The left magneto, Manufacturer: Bendix, P/N 10-51360, S/N B815207, was test run and produced a spark across a 7mm gap. See Figures 22 & 23.

Figure 22

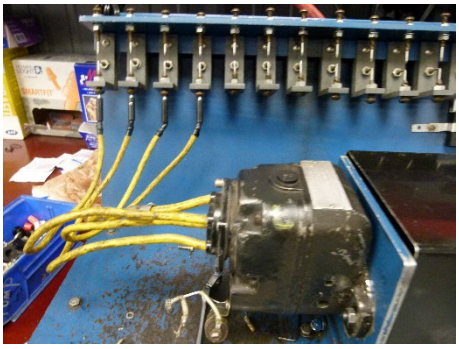

Figure 23

The right magneto, Manufacturer: Bendix, P/N 10-51360-26, S/N B817280, was test run and produced a spark across a 7mm gap. See Figures 24 & 25.

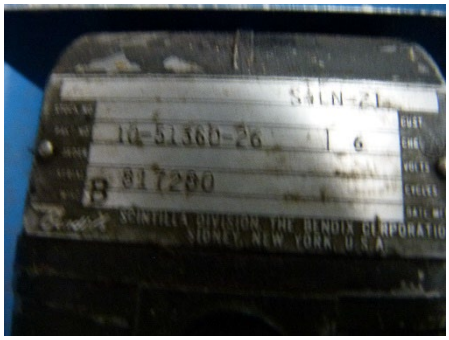

Figure 24

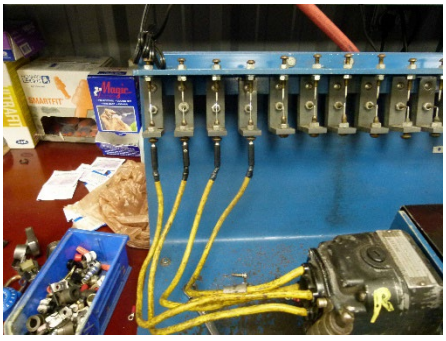

Figure 25

The ignition harness, Manufacturer: Skytronics, P/N C2-IAR11, exhibited normal operating signatures. See Figures 26 & 27.

Figure 26

Figure 27

The spark plugs, Manufacturer: Spitfire, P/N SR-88, were worn and dirty. See Figure 28.

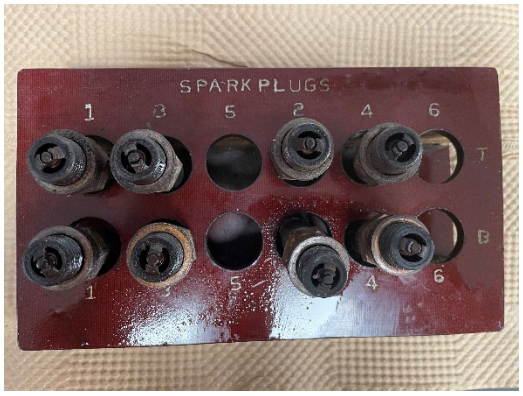

Figure 28

Lubrication System

The oil sump was damaged from impact on the front side. See Figures 29 & 30.

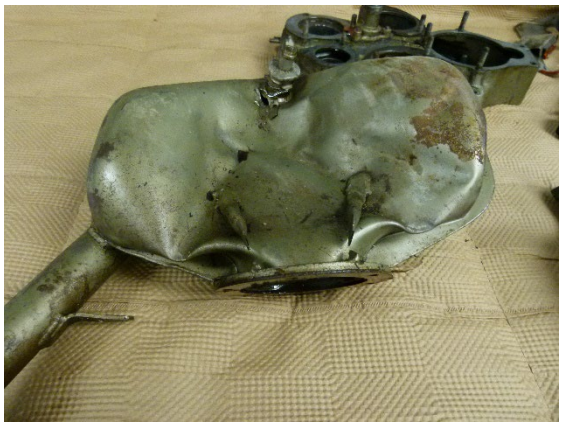

Figure 29

Figure 30

The oil pump exhibited normal operating signatures. See Figures 31 & 32.

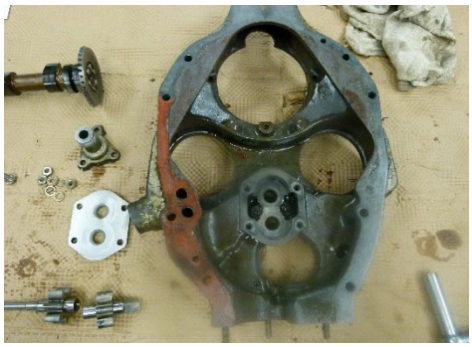

Figure 31

Figure 32

The oil filter, Manufacturer: Champion, P/N CH48108-1, was damaged from impact, breached, and was still attached to the adaptor. See Figures 33 & 34.

Figure 33

Figure 34

Cylinders

All four cylinders exhibited normal operating signatures. See Figures 35 through 38.

Figure 35

Figure 36

Figure 37

Figure 38

Rocker Arms and Shafts

The rocker arms and shafts exhibited normal operating signatures. See Figures 39 through 41.

Figure 39

Figure 40

Figure 41

Piston, Rings and Pin

All four pistons, P/N SA530348 P .015, exhibited normal operating signatures. See Figures 42 through 45.

Figure 42

Figure 43

Figure 44

Figure 45

Connecting Rods

The connecting rods, P/N illegible, Forging or S/N: 530186, exhibited normal operating signatures. See Figures 46 & 47.

Figure 46

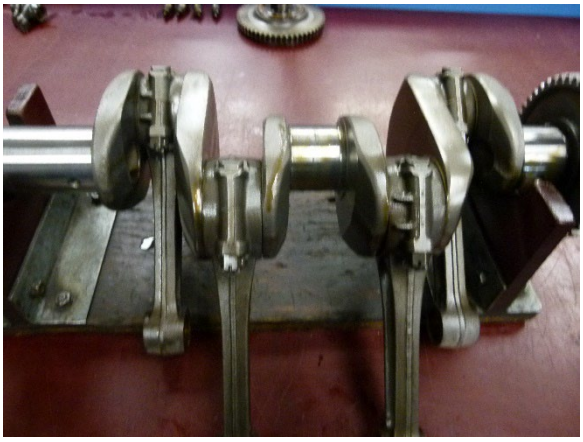

Figure 47

Connecting Rod Bearings

The connecting rod bearings, P/N ASC35897M.010, exhibited normal operating signatures. See Figures 48 through 51.

Figure 48

Figure 49

Figure 50

Figure 51

Crankcase Assembly

The crankcase, Casting numbers 1-3 627357 and 2-4 627358, S/N: 17, exhibited normal operating signatures. See Figures 52 & 53.

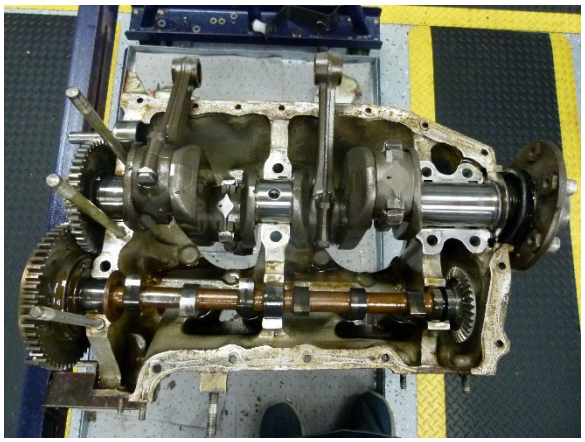

Figure 52

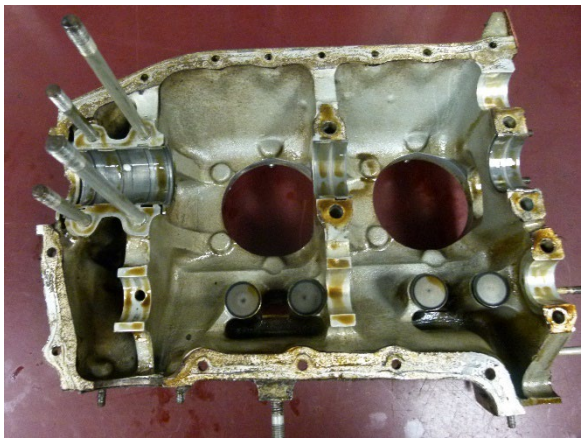

Figure 53

Main Bearings

The No. 1 main bearing, P/N: 633398M.010, exhibited normal operating signatures. See Figures 54 & 55.

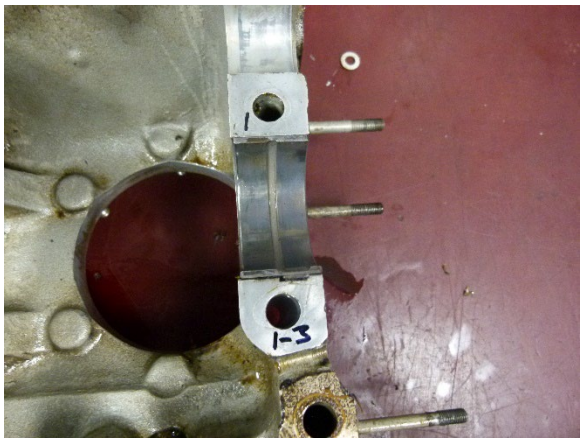

Figure 54

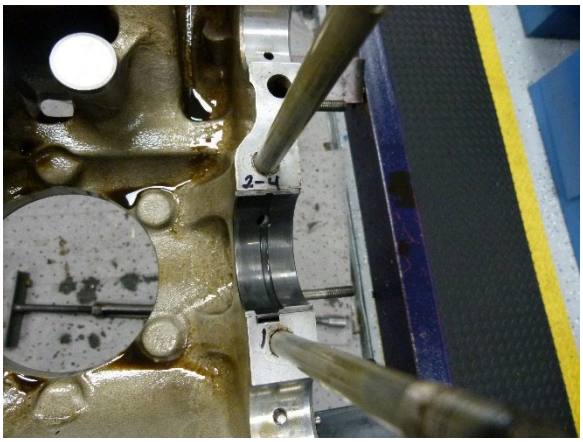

Figure 55

The No. 2 main bearing, P/N 633398M.010, exhibited normal operating signatures. See Figures 56 & 57.

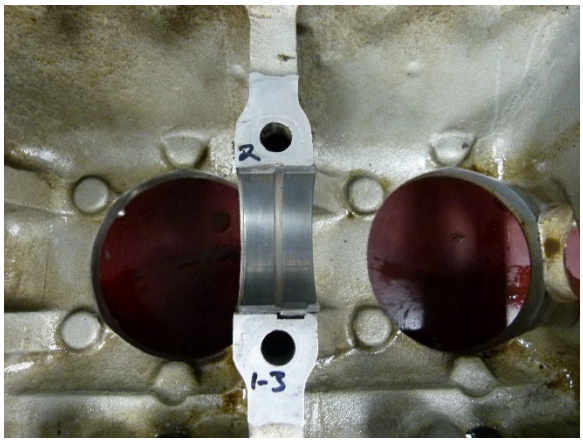

Figure 56

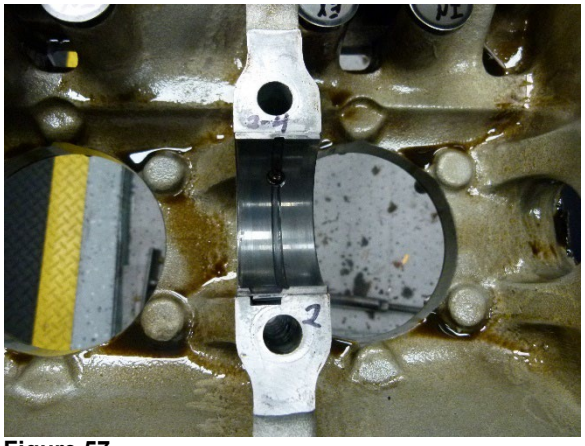

Figure 57

The No. 3 main bearing, P/N P/illegible, exhibited normal operating signatures. See Figures 58 & 59.

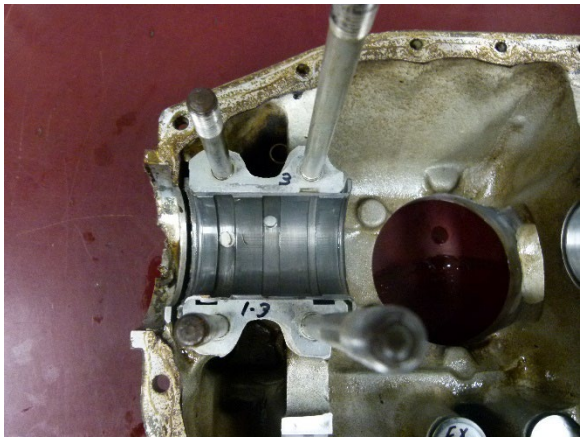

Figure 58

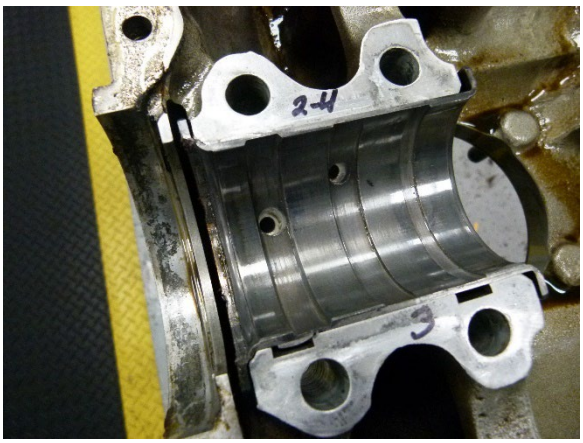

Figure 59

Crankshaft Assembly

The crankshaft, Forging No.53058, S/N: illegible, the crankshaft flange and slinger ring were fractured from impact forces. The remainder of the shaft exhibited normal operating signatures. See Figures 60 & 61.

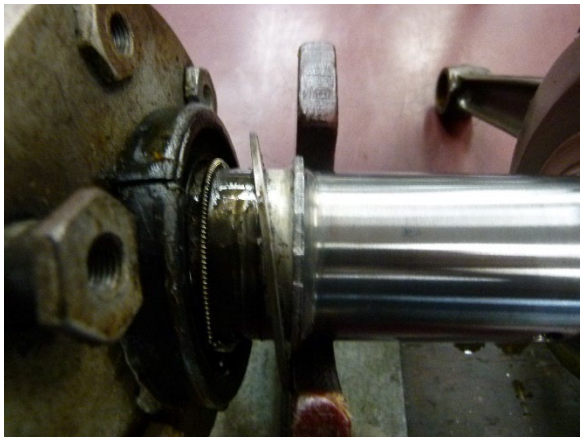

Figure 60

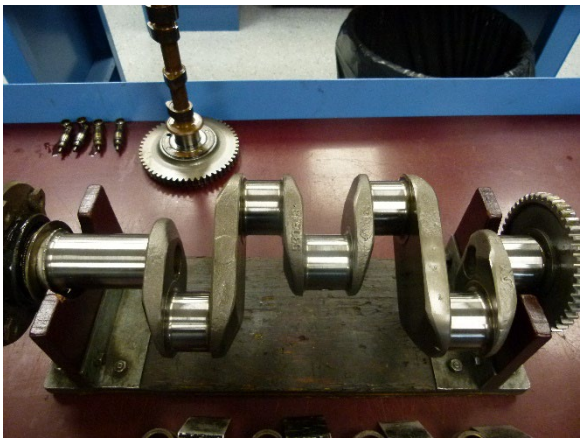

Figure 61

Internal Timing
The internal was found to be correct. See Figures 62 & 63.

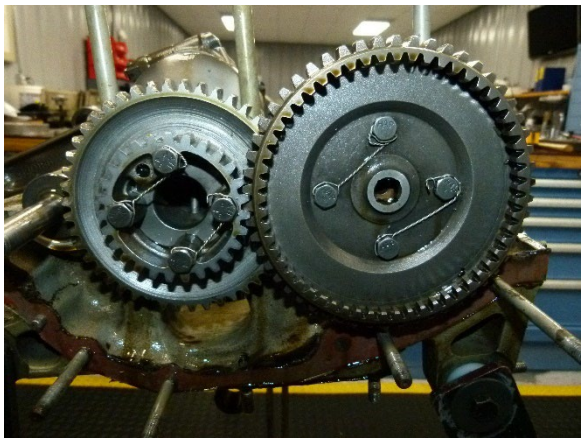

Figure 62

Figure 63

Camshaft
The camshaft, P/N 626608, S/N: 123037, exhibited normal operating signatures. See Figure 64.

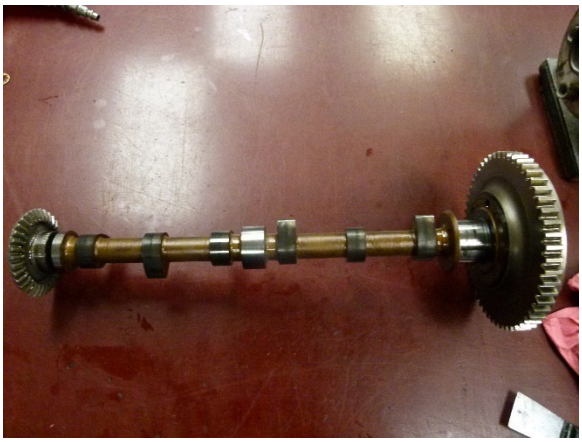

Figure 64

Accessory Gears

The gears exhibited normal operating signatures. The starter gear had damage from the engagement of the starter. The damage was most likely caused by engagement of the starter while the engine was running. See Figures 65 & 66.

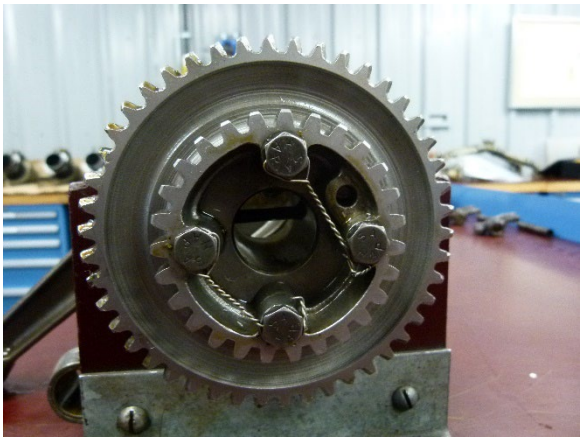

Figure 65

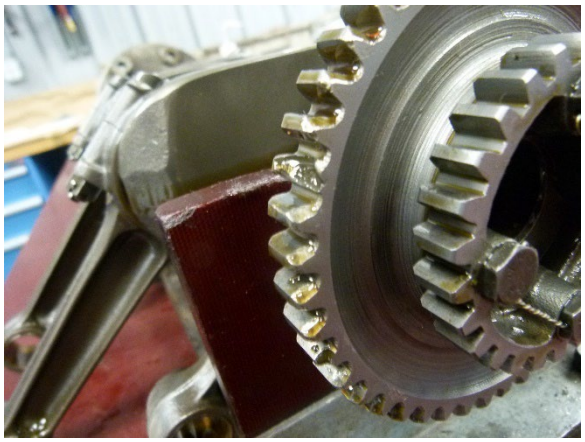

Figure 66

Accessories

The starter, Manufacturer: Delco-Remy, P/N 1109656, S/N: 45570, exhibited normal operating signatures. There was damage to the input gear. See Figures 67 & 68.

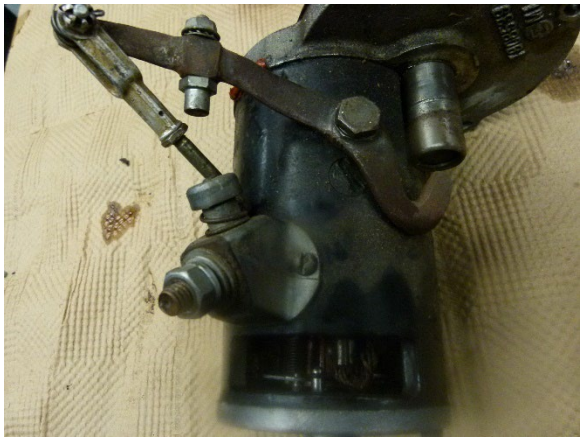

Figure 67

Figure 68

The generator, Manufacturer: Delco-Remy, P/N illegible, S/N: 1101889, exhibited normal operating signatures. See Figures 69 & 70.

Figure 69

Figure 70

The carburetor, Figure 71, Manufacturer: Marvel-Schebler, P/N MA-3SPA, S/N: 1032, was disassembled and was clean and intact. The carburetor had a two-piece venturi installed. The FAA AD 98-01-06 is applicable to this carburetor. The purpose of the AD is to prevent disruption of fuel flow to the engine resulting in failure to attain rated power, power loss in flight and forced landings. The AD calls for the inspection of the two-piece venturi at each annual, 100-hour, or progressive inspection to determine if the primary venturi, Figures 72 & 73 is loose or missing. Installing a one-piece venturi constitutes terminating action for the repetitive inspection requirements of the AD. The fuel inlet screen (finger strainer), Figure 75, was not installed in the carburetor, the fuel inlet fitting was installed directly in the carburetor as seen in Figure 74.

Figure 71

Figure 72

Figure 73

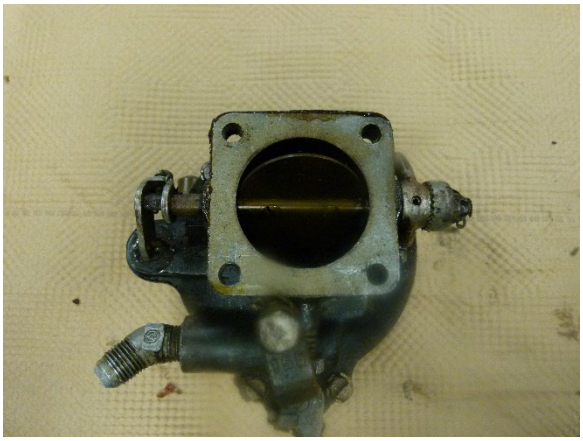

Figure 74

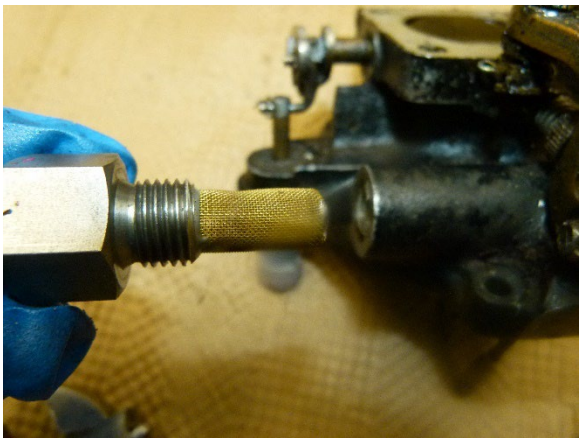

Figure 75

SUMMARY

The engine examination revealed no evidence of preimpact catastrophic mechanical malfunction or fire. The crankshaft flange was damaged from impact during the accident. The engine would not rotate, the inspection revealed that the slinger ring was broken which prevented rotation. The carburetor fuel inlet did not have the fuel inlet screen (finger fuel stainer) installed. The magnetos were tested and produced a spark across a 7mm gap. Except for the impact damage the engine exhibited normal operating signatures.

1.16.2 Aviation Gasoline (AVGAS) Analysis

A sample of fuel was taken from the right-wing tank of the aircraft at the crash site. The sample was sent for testing to AmSpec Laboratory in Florida, USA. The results reflected that the lead content of the fuel was lower than that of AVGAS, it also reflected that distillates found in the sample are indicative of fuel contamination.

1.16.3 Fuel Pump Test

The Facet electric fuel pump (FAA PMA P/N SS10603-1) was tested in accordance with instructions from Alpha Aviation Inc., the current STC Holder for FAA STC No. SA2628WE. The findings of the test revealed that the pump was found to be in working condition. There was a light amount of debris found on the fuel pump screen, as seen in Figure 76.

Figure 76

1.17 Organizational and Management Information

1.17.1 Jamaica Civil Aviation Authority

The JCAA is a statutory body setup under the Civil Aviation Act.

1.17.1.1 Safety Oversight

Safety oversight is defined as a function by means of which states ensure effective implementation of the safety-related Standards and Recommended Practices (SARPS) and associated procedures contained in the Annexes to the Convention on International Civil Aviation and related ICAO documents and is the foundation upon which safe global aircraft operations are built.

A part of the JCAA's mandate is to provide safety & security oversight in keeping with the Civil Aviation Act & the State's obligations under the Convention on International Civil Aviation.

The critical elements of the State's safety oversight system include:

1. Primary aviation legislation.
2. Specific operating regulations.
3. State civil aviation system and safety oversight functions.
4. Technical personnel qualification and training
5. Technical guidance, tools and the provision of safety-critical information.
6. Licensing, certification, authorizations and approval obligations.
7. Surveillance obligations; and
8. The resolution of safety concerns.

Primary aviation legislation

The Civil Aviation Act is the primary aviation legislation in Jamaica that sets out the establishment of the JCAA, the extent of its authority and empowerment of its Director General and provision for the independent investigation of accidents and incidents to ensure impartial and objective investigations to correct shortcomings in the system, not only within the aviation industry but also within the JCAA.

Specific operating regulations

The Civil Aviation Regulations, 2012 is the specific operating regulations in Jamaica which sets out in details the minimum requirements to be met by all service providers, regardless of the size and complexity of their civil aviation activity that satisfactory compliance will result in the desired level of safety.

Civil Aviation Regulations, 2012, the Seventh Schedule (Required Instruments & Equipment), Section 7.290 (Emergency Locator Transmitter) sets out the requirements for Emergency Locator Transmitters (ELT), however, the current Regulations does not stipulate the required frequencies for transmission as set out in ICAO Annex 10 (Aeronautical Telecommunications), Volume III

State civil aviation system and oversight functions.
In 1996 the JCAA was established, headed by a Director-General, supported by the appropriate and adequate technical and non-technical staff, and provided with adequate financial resources.

Section 6C of the Civil Aviation Act empowers the Authority to appoint and employ such officers and employees and agents as it thinks necessary for the proper carrying out of the provisions of the Act. The Director General is made responsible for the day-to-day management and operation of the Authority.

The Flight Safety Department is the unit within the JCAA which is tasked with the responsibility of carrying out safety and security oversight of civil aviation in Jamaica.

A Delegation of Functions Document was issued by the Director General, which authorizes the personnel listed therein to perform functions on behalf of the Director General, JCAA.

Technical personnel qualification and training
To effectively fulfil its responsibilities, the JCAA must be properly staffed with qualified personnel capable of accomplishing the required wide range of technical duties involved in safety and security oversight.

The minimum requirements for Aviation Safety Inspectors are set out in the Flight Safety Administration Procedures Manual (FSAM), Appendix I – Job Descriptions Flight Safety. The training guidelines for Aviation Safety Inspectors are set out in Section 3.4 and Appendix A.

Technical guidance, tools and the provision of safety critical information
The JCAA is responsible for the provision of technical guidance (including processes and procedures), tools (including facilities and equipment) and safety-critical information, as applicable, to the technical personnel to enable them to perform their safety and security oversight functions in accordance with established requirements and in a standardized manner. In addition, this includes the provision of technical guidance by the JCAA to the aviation industry on the implementation of applicable regulations and instructions.

There were no written procedures set out in the Inspector Guidance/Manual that guides an assigned Inspector as to the steps to be taken prior to granting authorization for foreign registered aircraft to operate in Jamaica for over 30 days in the calendar year.

Licensing, certification, authorizations, and approval obligations
The JCAA is responsible for the implementation of processes and procedures to ensure that personnel and organizations performing an aviation activity meet the established requirements before they are allowed to exercise the privilege of a license, certificate, authorization and/or approval to conduct the relevant aviation activity.

In keeping with Civil Aviation Regulations (CARs), 2012, The Tenth Schedule, Section 10.017 (b) the operator made an application to the Flight Safety Department on July 8,

2022, for approval to operate a foreign registered aircraft in Jamaica for more than 30 days in any calendar year. In support of the application, the following documents were submitted:

1. A copy of the Certificate of Airworthiness.
2. A copy of Certificate of Registration.
3. A copy of proof of Insurance.

The JCAA Flight Safety Division had given authorization for the foreign registered aircraft to operate in Jamaica for over 30 days in any calendar year in accordance with the CAR's The Twelfth Schedule, Section 12.017 (Operation of Foreign Registered Aircraft in Jamaica). The authorization was valid until January 19, 2024.

During the post-crash review of the documents submitted by the owner dated July 8th, 2022, in support of the application in respect of Schedule 10.017 subpart (b), specifically sub part (b)(6), it was noticed that the Authority had only a copy of a Confirmation of Insurance provided by BWI Aviation Insurance Agency, Inc. which noted Global Aerospace, Inc. as the Insurance Company at risk. However, the Confirmation of Insurance identified Tamiami Executive Airport in Kendall, Florida, USA as N3254B base of operation. Confirmation was therefore sought from Global Aerospace, Inc. The Company subsequently advised that the insurance policy restricted its coverage to "the territories of the United States of America, Canada, Mexico or the Bahamas Islands or while en-route between points therein". Based on this information, N3254B was not insured for operation in Jamaica at the time of the accident.

Surveillance obligations
The JCAA Flight Safety surveillance guidance procedures are set out in Section 18 of the FSAM. The Flight Safety Division develops Safety & Security Oversight Surveillance Plans. The FSAM sets out the minimum surveillance tasks to be accomplished.

There was no documentation found in the Flight Safety Department files of the aircraft being inspected, or of its records being reviewed, by Flight Safety Inspectors after the operator had been granted authorization to operate in Jamaica.

The resolution of safety concerns
The JCAA is responsible for the implementation of processes and procedures to resolve identified deficiencies impacting aviation safety which may be detected by the JCAA FSD or other persons.

The procedures to resolve identified deficiencies impacting aviation safety are set out in the FSAM and the Compliance & Enforcement Manual.

1.17.1.2 Air Navigation Services
The Air Navigation Services Division of the JCAA is tasked with providing air navigation services within the Kingston Flight Information Region as mandated by the Civil Aviation Act, and the Convention on International Civil Aviation.

Air Traffic Services at Tinson Pen Aerodrome
Aerodrome air traffic service is provided in the form of flight information service from a standalone tower to the east of the terminal building; this facility is operated by the JCAA Air Navigation Services Division.

"An Aerodrome Flight Information Service Unit (AFISU) provides services to aircraft flying within the aerodrome traffic zone and operating on the manoeuvring area of non-controlled aerodrome and where required, to aircraft operating within a traffic information zone (TIZ)." [ATS MANOPS Errata 2012]

Alerts and information on the weather, traffic, and essential aerodrome information are some of the services provided by the AFISU. This unit is not an air traffic control unit and as such the officers do not have the authority to issue clearances or instructions to aircraft, vehicles or personnel.

Investigation Documents provided by Air Traffic Services

- Voice Recordings – Tinson Pen FISU
- Duty Roster – Tinson Pen FISU
- FIO Report – Tinson Pen FISU
- Flight Progress Strip – Tinson Pen FISU
- Watch Log Entry – Tinson Pen FISU
- Transcript – Tinson Pen FISU
- Voice Recordings – KATCC
- Shift Sheet – KATCC
- Supervisor Report – KATCC
- Flight Progress Strip – KATCC
- Watch Log – KATCC
- TopSky Radar Recording – KATCC
- Snapshots of aircraft's radar position on the ASD - KATCC
- Meteorological report

1.17.1.3 Aircraft Accident Investigation
The JCAA FSD is the unit tasked with the responsibility to investigate aircraft accidents and incidents in Jamaica.

Adequate arrangements for security were provided at the crash site in Hampstead, St. Mary by the JCAA from the day of the accident until the removal of the wreckage from the crash site.

In the early stages of the investigation, justification had to be provided regarding the State's obligations under the Civil Aviation Act and the ICAO Convention to investigate aircraft accidents within its jurisdiction for funds to be disbursed to enable investigators to carry out aspects of the aircraft accident investigation that required funding.

The JCAA has no facility or arrangement for the safe storage of aircraft wreckage after removal from the crash site.

Approval was not received from the Ministry with responsibility for Transport for the Airworthiness Investigator to participate in the engine teardown examination.

1.17.2 Jamaica Defence Force

The JDF is the agency designated with the State's search and rescue obligations and maintains the capability, to search for, locate and rescue persons, aircraft and vessels in distress within the Kingston Flight Information Region (Jamaica and over the High Seas for which Jamaica has been given jurisdiction) on behalf of the JCAA. In order to carry out this task, the JDF currently uses its medium lift helicopters, inshore and offshore patrol vessels to effect rescue missions at sea. For land rescue missions, specifically trained and equipped infantry units enable this task to be conducted effectively. The Rescue Coordination Centre located at the JDF Headquarters Up Park Camp is responsible for the prompt provision of search and rescue services within the designated region.

1.17.3 Jamaica Fire Brigade

The JFB is the organization established under the Fire Brigade Act in 1988 to minimize the loss of lives, injury to persons and damage to property from fires, natural disasters, accidents, and other emergencies.

1.17.4 Jamaica Constabulary Force

The JCF is a department under the Ministry of National Security. It is the premier law enforcement arm of the Government and is responsible for the maintenance of law and order and enforcement of all the country's laws.

2.0 ANALYSIS

2.1 Aircraft Performance

Weight and balance calculations accomplished using the Certified Weight & Balance Report established that the aircraft was operated outside of the maximum weight limit authorized by the manufacturer. This would have adversely affected the aircraft's ability to glide and be maneuvered, as well as increased its rate of descent and stall speed after it experienced engine failure. The calculation also revealed that the center of gravity was within the limits as set out in FAA STC No. SA2628WE for the O-200 Engine Installation.

The flight was uneventful until the engine began to run rough and shut off. The pilot was able to restart the engine momentarily, however it shut off and after a few attempts he was unable to restart it, the aircraft lost altitude, contacted trees and crashed into the ground.

The engine teardown examination revealed that there was no fuel strainer assembly (finger strainer) installed in the carburetor fuel inlet. The purpose of the fuel strainer assembly is to prevent debris from entering into to the carburetor. The loss of engine power could be attributed to a few factors including but not limited to contamination of the aircraft fuel, carburetor icing and fuel starvation due to blockage.

Carburetor icing refers to ice which develops within the carburetor of a reciprocating engine when cooling associated with the expansion of air as it flows through the carburetor (Venturi Effect) and fuel evaporation causes condensation and freezing or deposition of ice. This type of icing occurs most commonly in clear air and at ambient temperatures well above freezing. The Meteorological Report on the date of the flight stated that the air temperature recorded was 31 degrees Celsius (87.8 degrees Fahrenheit) and the Dew Point was 24 degrees Celsius (75.2 degrees Fahrenheit). A review of these temperatures with the chart found in the FAA Special Airworthiness Information Bulletin CE-09-35 Carburetor Icing Prevention, puts the conditions within the boundary of icing (glide and cruise power), and just above the boundary for serious icing (glide power). Carburetor icing can cause a drop in engine speed and for the engine to begin to run roughly, if this continues without intervention the engine will quit.

2.2 Pilot Decision Making

The pilot's decision to operate the aircraft without donning his shoulder harness was a contributory factor to the fatal injuries he received. The pilot's decision to operate the aircraft above the maximum weight adversely affected the aircraft's ability to glide and resulted in an increase in the rate of descent of the aircraft.

2.3 Human Factors

Postmortem findings of the pilot were consistent with Shock & Hemorrhage, Polytrauma and multiple blunt force injuries. The histological report revealed nothing of significance that could reasonably contribute to sudden incapacitation or error of judgment during flight.

2.4 Jamaica Civil Aviation Authority Safety Oversight

Written procedures for use by Flight Safety Inspectors when authorizing foreign registered aircraft to operate in Jamaica for over 30 days in any calendar year would have enabled Flight Safety Inspectors to detect certain discrepancies and have them addressed prior to the granting of authorization to the operator.

2.5 Jamaica Civil Aviation Authority Accident Investigation

In the early stages of the investigation, justification had to be provided as to the State's obligations under the Act and the ICAO Convention to investigate aircraft accidents for funds to be disbursed to enable investigators to carry out aspects of the aircraft accident investigation that needed funding.

The Airworthiness Investigator was unable to participate in the engine teardown examination at the engine manufacturer's facility in Mobile, Alabama, USA, as the requisite approval from the Ministry responsible for Transport was not forthcoming.

The JCAA does not have a facility to secure the storage of the aircraft wreckage whiles it completes its investigation.

2.6 Jamaica Civil Aviation Authority Air Traffic Services

Although there were some deficiencies of ATS's operations, there were no air traffic control factors that contributed to the cause of the accident.

2.7 Jamaica Defence Force

The JDF had serviceable aircraft and competent personnel who carried out their duties and responsibilities regarding search and rescue.

2.8 Jamaica Fire Brigade

The JFB responded promptly to the emergency call with an adequate number of units and personnel.

2.9 Jamaica Constabulary Force

The JCF responded promptly to the emergency call with an adequate number of personnel and secured the crash site until the arrival of JCAA personnel.

3.0 CONCLUSION

3.1 Findings

1. The aircraft experienced a loss of engine power in flight, and eventually a total loss of engine power.
2. The pilot did not have a valid medical certificate issued by the FAA or JCAA at the time of the accident.
3. The aircraft was fitted with a shoulder harness assembly in accordance with FAA Policy Statement Number ACE 00-23.561-01.
4. The pilot was wearing a lap belt; however, he did not wear his shoulder harness throughout the flight.
5. The fatal injuries sustained by the pilot might have been prevented had he been wearing his shoulder harness.
6. The passenger was wearing his shoulder harness throughout the flight.
7. The aircraft was being operated above the maximum weight authorized.
8. The aircraft was fitted with an ELT.
9. The ELT fitted on the aircraft had a stated transmission frequency of 121.5 MHz/ 243 MHz
10. The Civil Aviation Regulations 2012, The Seventh Schedule, Paragraph 7. 290 does not stipulate the transmission frequencies for ELT's.
11. There was no entry found in the aircraft records that demonstrated compliance with FAA Accessory AD 98-01-06, with an effective date of February 13, 1998, applicable to Carburetor Model MA-3SPA fitted to the engine.
12. The engine examination revealed no evidence of preimpact catastrophic mechanical malfunction or fire.
13. The engine crankshaft flange and slinger ring were fractured from impact forces.
14. The fuel inlet strainer assembly (finger stainer) was not installed on the carburetor for the engine.
15. The test of the engine ignition system revealed that it was in working condition.

16. The fuel sample tested indicated evidence of fuel contamination.
17. The test of the fuel pump revealed that it was in working condition.
18. The meteorological conditions reported at the time of operation (temperature and dew point) put the operation within the boundary of icing (glide and cruise power) and just above the boundary of serious icing (glider power) as set out in FAA Special Airworthiness Bulletin (SAIB) CE-09-35, Carburetor Icing Prevention.
19. The JCAA Flight Safety Division had given authorization for the foreign registered aircraft to operate in Jamaica for over 30 days in any calendar year. This authorization was valid until January 19, 2024.
20. The aircraft was not insured for operations in Jamaica at the time of the accident.

4.0 SAFETY RECOMMENDATIONS

4.1 Safety Action Taken

None

4.2 Safety Action Required

Aircraft Operators:

1. Shall wear their shoulder harnesses throughout the required phases of flight.
2. Shall exercise due care regarding the quality of the fuel that is acquired for the safe operation of their aircraft.
3. Should pay careful attention to the meteorological conditions that give rise to the onset of carburetor icing.
4. Shall ensure that all AD's including those applicable to accessories fitted to their aircraft have been accomplished.
5. Shall ensure that the aircraft operate within the weight and balance limitations for the aircraft.

JCAA – Flight Safety Division:

1. That the JCAA develop written procedures for the use of Flight Safety Personnel in the authorization of foreign registered aircraft over 30 days, these procedures should include provisions for the verification of all required aircraft documents submitted by the operator with the issuing body as well as a physical inspection of the aircraft and its records.
2. That foreign registered aircraft operating in Jamaica over thirty (30) days, be included in the Annual Surveillance Plan of the Flight Safety Department.

JCAA – ANS:

1. That all ATS personnel complete the necessary recurrent training that will enable them to carry out their duties with a high degree of safety.

JCAA – Aircraft Accident Investigation:

1. That the JCAA set aside adequate financial resources to ensure that the accident investigation team are able to conduct all aspects of the aircraft accident investigation without curtailment or delay.

2. That the JCAA takes immediate steps to put in place an agreement/arrangement with a logistic company for the movement of aircraft wreckage from the accident site to a secure location where the investigation can continue unimpeded.
3. That the JCAA takes immediate steps to put in place an arrangement with a facility for the safe and secure storage of aircraft wreckage whiles it conducts its investigation.

JCAA – Regulations:

1. That the Civil Aviation Regulations, the Seventh Schedule, Section 7.290 be amended to include the requirement for ELTs to include simultaneous transmission on both 121.5 MHz & 406 MHz frequencies as set out in ICAO Annex 10 (Aeronautical Telecommunications), Volume III.

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APPENDIX 1

Ed's Flying Service, Inc.
Alamogordo-White Sands Regional Airport
3500 Airport Road
Alamogordo, NM 88310
P (575) 437-4350
F (575) 437-8905
edsairplane@newmdc.com

5-13-2019

Ercoupe 415C N3254B s/n 1018

Aircraft weighed on wheels with 5 gallons in nose tank.

	Weight	ARM	Moment
Nose	278	-17.1	- 4754
Left	366	43.5	15921
Right	363	43.5	15791
Total	1007	26.8	26958

Removeing fuel:

Aircraft	1007	26.8	26958
Nose fuel	- 30	7.0	- 210

Empty weight 977 lbs Empty arm 27.4in Empty moment 26748 in-lb

Robert E Pavelka
2257302 A&P/IA

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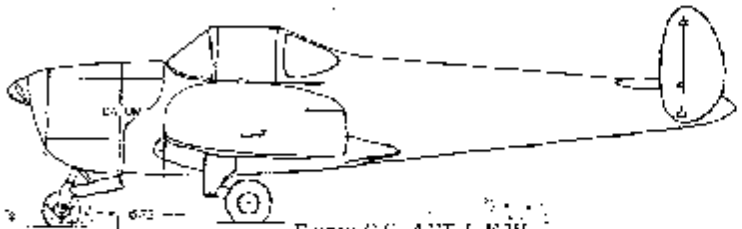
APPENDIX 2



Empty C.G. AFT L.E.W.= ———=

Empty C.G. AFT Datum=25.75 26.77 =

EXTREME C. G. POSITIONS

	Forward C. G.			Rearward C. G.		
	WT.	ARM	MOM.	WT.	ARM	MOM.
Empty Weight (Actual / Computed)	872	26.7	26048	872	26.7	26048
Pilot	170	37	6290	170	37	6290
Gasoline—Fuselage Tank	36	7	252	36	7	252
Gasoline—Wing Tank—L.	54	25	1350	36	25	900
Gasoline—Wing Tank—R.	54	25	1350	—	—	—
Oil	8	-34	-112	8	-14	-112
Passenger				170	37	6290
Baggage				25	37	
Total				1287		
L.C.G. AFT Datum						
H.C.G. % M.A.C. (— 15.6 / 37.1)						

Weighed Sept 20 22

L.E.M.A.C. is 10.9 AFT DATUM M.A.C.=37.1

APPROVED C. G. LIMITS

FWD.: 26.4 AFT Datum RWD.: 30.3 AFT Datum

BAGGAGE ALLOWANCE	
1. Pilot & No Passenger	65
2. Pilot & Passenger (Max. Fuel)	0
3. Pilot & Passenger (Min. Fuel)	15
4. Max. Baggage Never to Exceed	65
5. Minimum Fuel—Gals.	12

EQUIPMENT LIST

Spec. No.	Item	Unit Wt.	Arm
*01	Propeller	14 lbs.	-32
104-a	Carburetor Air Heater	5 lbs.	-2
135 c	Fuel Pump	2 lbs.	-27
106-a	Engine	566 lbs.	-22
102-b	Landing Gear (Main)	28 lbs.	+44
103-b	Landing Gear (Nose)	9 lbs.	-16
302-b	Battery (12 Volt)	25 lbs.	-55
107-a	Starter	14 lbs.	-7
308-a	Generator	10 lbs.	-8
	Voltage Regulator	2 lbs.	+50

APPENDIX 2 CONT'D

ENGINEERING & RESEARCH CORPORATION
RIVERDALE, MARYLAND

WEIGHT AND BALANCE

ERCOUPE MODEL 415-C

SERIAL NO. 1018 NC3Z548

PRODUCTION CERTIFICATE NO. 17

Approved by: ______ ______ Weight & Balance Engineer

Verified by: ______ ______ Inspector for the Authority

Date of Manufacture 1948

EMPTY WEIGHT DATA		
	NET WEIGHT	
	Actual	Computed
Rear Right Wheel	336	
Rear Left Wheel	336	
Nose Wheel	220	
Total Weight	892	

Gross Weight = 1260 1320

Useful Load = 428

APPENDIX 3

Weight & Balance Report
N3254B
Certified on May 13th, 2019
Cof G Limits – FWD 26.4 - RWD 30.3

	Weight LB	Arm	Moment
Empty weight	**977**	**27.4**	**26748**
Pilot	**170**	**37**	**6290**
Fuel Front Tank	**18**	**7**	**252**
Fuel Wing Tank- L	**27**	**25**	**675**
Fuel Wing Tank – R	**27**	**25**	**675**
Oil	**8**	**-14**	**-112**
Passenger	**155**	**37**	**5735**
Baggage	**5**	**57**	**285**
Total	**1387**		**40,548**

Center of Gravity – 40,548 / 1371 = 29.23

Weight & Balance Report
N3254B
January 2022 but Not Certified
Cof G Limits – FWD 26.4 - RWD 30.3

	Weight LB	Arm	Moment
Empty weight	**892**	**26.7**	**23,816.4**
Pilot	**170**	**37**	**6290**
Fuel Front Tank	**18**	**7**	**252**
Fuel Wing Tank- L	**27**	**25**	**675**
Fuel Wing Tank – R	**27**	**25**	**675**
Oil	**8**	**-14**	**-112**
Passenger	**155**	**37**	**5735**
Baggage	**5**	**57**	**285**
Total	**1302**		**37,616.4**

Center of Gravity – 37616.4 / 1302 = 28.9