Republic of the Philippines
DEPARTMENT OF TRANSPORTATION
**CIVIL AVIATION AUTHORITY OF THE PHILIPPINES**
MIA Road, Pasay City 1300

# AIRCRAFT ACCIDENT INVESTIGATION AND INQUIRY BOARD

## FINAL REPORT

## RP-C1889
## TECNAM P2002JF

***OPERATOR: WCC AVIATION COMPANY INC.***

***TYPE OF OPERATION: FLIGHT TRAINING (PCAR PART 3)***

***DATE OF OCCURRENCE: SEPTEMBER 06, 2022***

***PLACE OF OCCURRENCE: BARANGAY BAYBAY SUR, SUAL, PANGASINAN, PHILIPPINES***

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(Tecnam P2022JF, RP-C1889 Final Report)

# FOREWORD

This report was produced by the Aircraft Accident Investigation and Inquiry Board (AAIIB), Civil Aviation Authority of the Philippines, MIA Road, Pasay City, Philippines.

The report is based upon the investigation carried out by the AAIIB in accordance with Annex 13 to the Convention on International Civil Aviation, Republic Act 9497 Section 42 and Philippine Civil Aviation Regulation Part 13.

Readers are advised that the AAIIB investigates for the sole purpose of enhancing aviation safety. Consequently, AAIIB reports are confined to matters of safety significance and may be misleading if used for any other purpose. It should be noted that the information in AAIIB reports and recommendations is provided to promote aviation safety and in no case is it intended to imply blame or liability.

Furthermore, No part of AAIIB report or reports relating to any accident or investigation shall be admitted as evidence or used in any suit or action for damages arising out of any matter mentioned in such report or reports.

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# FINAL REPORT

**TITLE**: An accident incident involving a Tecnam P2002JF type of aircraft with Registry Number RP-1889, operated by WCC Aviation Company Inc. had a forced landing event at Brgy. Baybay, Sual, Pangasinan, Philippines, on September 06, 2022, at around 1104H.

## Notification of Occurrence to National Authority

The accident was reported by the CAAP Operations Center to the CAAP AAIIB on September 06, 2022.

## Identification of the Investigation Authority

The Aircraft Accident Investigation and Inquiry Board (AAIIB), the mandated accident investigation organization within the Civil Aviation Authority of the Philippines (CAAP) as the state of Occurrence/Registry/Operator conducted the investigation.

## Organization of the Investigation

In accordance with the provisions of the Philippine Civil Aviation Regulation (PCAR) Part 13, an Investigator-In-Charge was appointed.

## Authority Releasing the Report

The Final Investigation Report was released by the Aircraft Accident Investigation and Inquiry Board (AAIIB) and published on the CAAP website on **21 January 2023.**

## Synopsis:

On or about 1104H on September 6, 2022, a Tecnam P2002JF aircraft with registry number RP-C1889 sustained substantial damage after a forced landing in the middle of a rice field in Brgy. Baybay, Sual, Pangasinan, due to engine power loss. The aircraft is owned and operated by WCC Aviation Company Inc., based at Binalonan Airfield, Binalonan, Pangasinan.The aircraft was on a scheduled navigation exercise, approximately 35 NM west of the airfield, when it experienced a sudden drop in engine RPM, leading to a complete loss of engine power. The flight instructor and her student trainee safely exited the aircraft without injuries. The investigation could not determine the probable cause of the accident, as post-accident tests and engine top overhaul inspections failed to identify the exact engine component responsible for the degradation in performance that caused the accident.

# LIST OF ACRONYMS AND ABBREVIATIONS

| | | |
|---|---|---|
| AAIIB | : | Aircraft Accident Investigation and Inquiry Board |
| AFM | : | Aircraft Flight Manual |
| AMO | : | Approved Maintenance Organization |
| AMT | : | Aircraft Maintenance Technology |
| ATOC | : | Approved Training Organization Certificate |
| CAAP | : | Civil Aviation Authority of the Philippines |
| CDI | : | Capacitor Discharge Ignition |
| CPL | : | Commercial Pilot License |
| ELT | : | Emergency Locator Transmitter |
| FI | : | Flight Instructor |
| OFSAM | : | Office of the Flight Surgeon and Aviation Medicine |
| PARCC | : | Philippine Aeronautical Rescue Coordination Center |
| PCAR | : | Philippine Civil Aviation Regulation |
| PPL | : | Private Pilot License |
| PT | : | Pilot Trainee |
| TSN | : | Time since New |
| TSO | : | Time since Overhaul |
| VFR | : | Visual Flight Rules |
| VHF | : | Very High Frequency |
| VMC | : | Visual Meteorological Condition |

# 1. FACTUAL INFORMATION

| | | |
|---|---|---|
| Aircraft Registration No. | : | RP-C1889 |
| Aircraft Type/Model | : | Tecnam P2002JF |
| Operator | : | WCC Aviation Company Inc. |
| Address of Operator | : | 960 Aurora Blvd., Cubao, Quezon City, Philippines |
| Place of Occurrence | : | Brgy. Baybay Sur, Sual, Pangasinan, Philippines |
| Date/Time of Occurrence | : | September 06, 2022/1104H |
| Type of Operation | : | Flight Training |
| Phase of Operation | : | Cruising |
| Type of Occurrence | : | Reciprocating engine - non-mechanical failure |

## 1.1 History of Flight

On or about 1104H of 06 September 2022, a Tecnam P2002JF type of aircraft with registry number RP-C1889 was involved in a forced landing accident at Sual, Pangasinan. On-board the aircraft was one (1) Flight Instructor (FI) and one (1) Pilot Trainee (PT) who is already a PPL holder.

The flight left Binalonan airfield for a scheduled flight navigation exercise 35 nautical miles west of the station on the day of the accident. The flight took off from Binalonan and flew over Manoag, San Fabian, and the Hundred Islands area, where they performed multiple orbit exercises. After completing the maneuvering exercises, they proceeded to Bolinao and initiated to climb to 2,500 feet. The throttle was set to full power during the climb, but the flight crew noticed that the engine sound was different from the usual full throttle sound and that the engine rpm was only around 1,800rpm, which is below the normal full power setting of 2,100rpm.

The FI took over the controls and initiated an emergency procedure in response to a suspected engine power loss in flight. After observing that the engine parameters had not changed, the FI declared an emergency via 121.90 MHz frequency and stated their intention to proceed to Lingayen airport for an emergency landing. The crew noticed that the engine rpm was now fluctuating between 1,800 and 800rpm while en route to Lingayen and over the Sual area, and



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the aircraft began to lose altitude. With the aircraft's unpredictable engine performance and could no longer sustain its flight towards the nearest airport, the FI looked for the most suitable emergency landing area, which later identified a rice field located on their 4 o'clock position.

The aircraft came down in the middle of a rice field in Brgy. Baybay at the town of Sual, Pangasinan, Philippines. Following the forced landing, both aircraft occupants were able to safely evacuate, and were later assisted by nearby residents.

### 1.2 Injuries to Person (s)

| Injuries | Crew | Passengers | Others | **TOTAL** |
|---|---|---|---|---|
| Missing/Fatal | 0 | 0 | 0 | **0** |
| Serious | 0 | 0 | 0 | **0** |
| Minor | 0 | 0 | 0 | **0** |
| None | 2 | 0 | 0 | **2** |

### 1.3 Damage to Aircraft

The aircraft sustained substantial damage.

### 1.4 Personnel Information

#### 1.4.1 Flight Instructor

| | | |
|---|---|---|
| Gender | : | Female |
| Date of Birth | : | March 31, 1995 |
| Nationality | : | Filipino |
| License | : | 105564 (CPL/FI) |
| Valid up to | : | April 30, 2027 (CPL), May 31, 2023 (FI) |
| Medical Certificate | : | Class 1 valid until March 03, 2023 |
| Date of last medical | : | February 08, 2022 |
| Total Flying Time | : | 975 + 17 Hours as of 06 September 2022 |
| Total Flying Time On Type | : | 797 + 16 Hours as of 06 September 2022 |

The FI started her flying lessons with WCC and completed her pilot training last CY 2017. She then joined WCC last May 2021 as one of the school's FI. On the day of the accident, she already had a total time of 751+46 hours as FI for a Tecnam P2002JF type of aircraft. Apart from her ratings on a P2002JF, she is also rated to fly a C152, C172 and P2006T aircraft.



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### 1.4.2 Pilot Trainee

| | | |
|---|---|---|
| Gender | : | Male |
| Date of Birth | : | December 30, 1999 |
| Nationality | : | Filipino |
| License | : | 142769 (PPL) |
| Valid up to | : | April 30, 2024 |
| Medical Certificate | : | Class 2 valid until 30 September 2022 |
| Date of last medical | : | September 30, 2020 |
| Total Flying Time | : | 128 + 55 Hours as of 06 September 2022 |
| Total Flying Time On Type | : | 62 + 0 Hours as of 06 September 2022 |

As for the pilot trainee, he started his flight lessons at WCC last CY2019 and was able to secure his Private Pilot License (PPL) last April 2022. On the day of the accident, he has already accumulated a total of 62+0 hours on the involved type of aircraft. Likewise, the flight last 06 September 2022 was his scheduled navigation exercise flight at 35 NM West of the station.

During the interview of both pilots, there was no mention of any mental or physical issues encountered prior to their flight. On further evaluation of their qualifications and competency particularly with the involved FI to include physical and human factor capabilities, it can be noted that there are no issues that can be attributed as one of the factors on this incident.

## 1.5 Aircraft Information

The Tecnam P2002JF is a two-seater side by side, low wing aircraft. The P2002JF features superlative performance and flying qualities. The ease of piloting and maintenance make this aircraft an excellent solution for training in flight schools. It is also an ideal platform for surveillance and as well as for pure recreational and private use.

### 1.5.1 Aircraft Data

| | | |
|---|---|---|
| Registration Mark | : | RP-C1889 |
| Manufacturer | : | Costrozioni Aeronautiche Tecnam |
| Type/Model | : | P2002JF |
| Serial Number | : | 125 |
| Date of Manufactured | : | 2010 |
| Aircraft Total Time | : | 4,606 + 23 Hours as of 27 August 2022 |
| Certificate of Airworthiness | : | Valid until November 05, 2022 |
| Certificate of Registration | : | Valid until April 09, 2023 |
| Gross Weight | : | 620 Kilograms (Kgs.) |

### 1.5.2 Engine Data

The Rotax 912S2 series is a four cylinder, four stroke engine. The engine is liquid and air cooled with an integrated 1:2.4286 reduction gear. The use of liquid cooled heads and air-cooled cylinders allows the engine to maintain safe operating temperature even if a rapid descent is performed immediately after a prolonged climb.



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| | | |
|---|---|---|
| Manufacturer | : | BRP Rotax |
| Type/Model | : | Piston/912S2-01 |
| Engine Serial Number | : | 4924729 |
| Time Between Overhaul | : | 2,000 hours |
| Time Since Overhaul | : | 146 + 40 hours |
| Time Since New | : | 2,146 + 40 hours |

### 1.5.3 Propeller Data

The aircraft is equipped with a two bladed Hoffman fixed-pitch propeller in wooden composite construction.

| | | |
|---|---|---|
| Manufacturer | : | Hoffman |
| Type/Model | : | Fixed Pich/H0176HM-A-174-177C |
| Propeller Serial Number | : | 79671 |
| Time Between Overhaul | : | On-Condition |
| Time Since Overhaul | : | 2,598 + 49 hours |
| Time Since New | : | 4,799 + 26 hours |

## 1.6 Meteorological Information

Visual Meteorological Conditions (VMC) prevailed at the time of the accident.

## 1.7 Aids to Navigation

The flight was carried out under Visual Flight Rules (VFR). Using VFR, the pilot must be able to operate the aircraft with visual references to the ground and visually avoiding obstructions and other aircraft.

## 1.8 Communications

The aircraft is equipped with a standard radio transceiver. Communications were carried out between the pilot and other traffic within the area.

## 1.9 Flight Recorders

The aircraft is not equipped with flight recorders and existing Philippine Civil Aviation Regulation does not require such for that type of aircraft.

## 1.10 Wreckage and Impact Information

The accident site was at the rice field of Brgy. Baybay Sur, Sual, Pangasinan located approximately 12.06 NM from Lingayen airport and 30.88 NM from Binalonan airfield. After its initial touchdown, the aircraft glided approximately 41.35 meters before making a full stop at coordinates 16º 07’42.3” N, 120º 03’12.1” E.

Upon impact, the aircraft sustained damages on its lower fuselage, wings, and engine cowling area. Likewise, the aircraft propeller was noted to have been broken after contacting the ground.



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Figure 1 – RP-C1889 at the middle of the rice field


Figure 2 – RP-C1889 at its final stopping point



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### 1.11 Medical and Pathological Information

The FI and the Pilot Trainee completed the mandatory drug and alcohol testing at the local hospital which was later endorsed to CAAP OFSAM for the required post-accident medical examination. Both pilots were later issued with a medical clearance by the mentioned CAAP office.

### 1.12 Fire

There was no post-crash fire observed during on-site investigation

### 1.13 Survival Aspects

The accident was survivable since the aircraft was generally intact particularly the cockpit area even if it incurred substantial damages on its structure after the forced landing. The occupants were unharmed and were able to immediately vacate the aircraft without any restrictions. Further, the accident site was within some nearby residential houses thus immediate assistance was provided to the flight crew. In addition, the aircraft ELT was able to transmit an emergency signal after the aircraft impacted the ground. The signal was picked-up by the CAAP Air Traffic Service and PARCC which later resulted to the immediate response of concerned units to the site of the accident.

### 1.14 Organizational and Management Information

WCC Aviation Company, Inc. was founded in 2005 with the vision of being a complete and exceptional aviation school and at the same time a community of aviation professionals. It has a CAAP Approved Training Organization Certificate (ATOC) to offer pilot courses, and Diploma in Aircraft Maintenance Technology (AMT) program. The aviation school also expanded their offerings to BS Aviation, BS Aeronautical Engineering, BS Tourism and Senior High School ABM and STEM track focusing on the aviation industry.

## 2.0 ANALYSIS

### 2.1 Flight Operations Procedure

On the day of their departure for the scheduled flight navigation training, the pilot trainee conducted the aircraft walkaround inspection and run-up check procedures under the FI's supervision. There was no unusual remarks noted during the inspection and run-up hence the flight departed Binalonan airfield as scheduled. From Binalonan, the flight proceeded over Manoag, San Fabian then Hundred Islands area where they perform multiple orbit exercises. Throughout the flight, the pilot trainee was in the controls of the aircraft until they initiated their climb to 2,500 ft. to which an unusual aircraft engine sound was noted with the power on full throttle. The FI then took over the controls and performed the standard emergency procedures.

Under the Tecnam P2002-JF Aircraft Flight Manual (AFM), 3rd Edition, Rev. 0, Emergency Procedures-Engine Failures, the following are the actions that corresponds to "Engine Failure During Flight – Irregular Engine RPM":



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1. Throttle: check position and adjustable friction
2. Check engine gauges
3. Check both fuel quantity indicators
4. Carburetors heating: ON
5. Electric fuel pump: ON

If the engine continues to run irregularly:

6. Fuel selector valve: change the fuel feeding to the tank not in use (e.g., if you are drawing fuel from the LEFT tank, change to RIGHT or v.v.)

If the engine continues to run irregularly:

7. Ignition key: check both
8. Land as soon as possible

During the interview with the FI, she stated that the above emergency SOPs were performed and completed. However, the engine parameters continue to deteriorate despite of their effort of identifying and rectifying the abnormal engine performance. When it was further observed that the engine rpm started to fluctuate to a much lower value and the aircraft started to loss altitude, the decision was made to discontinue the plan of diverting to Lingayen airport and instead performed the forced landing in the middle of the rice field located at Sual, Pangasinan.

On the execution of the emergency landing, the following are the procedures available under Tecnam P2002-JF AFM:

Chapter 7 – Landing Emergency
7.1 Forced Landing Without Engine Power

1. Flap: UP
2. Airspeed: 69 KIAS
3. Find a suitable place to land safely, plan to approach it upwind.
4. Fuel selector valve: OFF
5. Electric fuel pump: OFF
6. Magnetos: OFF
7. Safety belts: Tighten
8. Canopy locks: CHECK LOCKED

When certain to land

9. Flaps: as necessary
10. Generator and Master switches: OFF

7.2 Power-On Forced Landing

1. Airspeed: 69 KIAS
2. Flaps: UP
3. Locate the most suitable terrain for emergency landing, plan to approach it upwind.
4. Safety belts: Tighten
5. Canopy locks: CHECK LOCKED

When certain to land, right before touchdown

6. Flaps: as necessary
7. Fuel selector valve: OFF
8. Electric fuel pump: OFF



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9. Magnetos: OFF
10. Generator and Master switches: OFF

Based on the above emergency procedures, the pilot was able to execute the forced landing in a safe manner which resulted them to pull through with the accident without any incurred serious injuries.

## 2.2 Aircraft Status

### 2.2.1 Pre-Flight Inspection

Visual inspection of the aircraft by both the assigned mechanic and the involved flight crew were completed prior to its scheduled departure. The assigned mechanic stated on his interview that during the engine run-up of RP-C1889, all parameters have been observed to be within the normal limits i.e. static rpm, magneto check, oil temperature, oil and fuel pressure. This has been documented under the Tecnam P2002-JF Pre-Flight Inspection Checklist dated 06 September 2022. On the subject document, the aircraft was released for flight that day without any recorded discrepancy.

### 2.2.2 Maintenance Records

Review of the aircraft records such as the Airframe, Propeller and Engine logbooks have been found to be all available and in order.

On the day of the accident, there were also no discrepancies reported after the first two (2) flights of the involved aircraft.

As for the assigned maintenance personnel who handled and released the aircraft that day, he was found to be a holder of a current CAAP issued AMT License. He is also trained and rated for the Tecnam P2002-JF type of aircraft and Rotax 912S engine. He is likewise authorized to release such type of company aircraft.

### 2.2.3 Refueling

An interview with the Manager - Fuel Operations of WCC was also conducted. This is to determine if there are any issues that might have compromised the integrity of the fuel being loaded in the aircraft. On this interview, the following WCC procedures were presented to the investigators:

1. Maintenance Organization Procedures Manual Chapter:
   A. 1.2.2.2.1 – Procedures in Refueling
   B. 1.2.2.2.2 – Protocol in Refueling
2. Maintenance Control Manual Chapter 6.2 – Fueling

On the review of the above documents, it can be said that WCC has an established process for this type of aircraft servicing though the previous recommendations of the AAIIB on refueling, Re: RP-C1028 Forced Landing Incident last 21 April 2022 is still yet to be incorporated on those manuals.



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With reference to the submitted documents and statements provided by the concerned personnel related to the conduct of fueling/refueling activities, there was no significant issue noted that can be attributed as a factor on this occurrence, but the following have been found to be needing internal actions within WCC:

1. The current Fuel Manager has yet to undergo a formal training for his position and functions. It is significantly essential that personnel performing critical task on the aircraft are competent to carry-out their day-to-day activities. The operator should ensure that all personnel are trained and certified prior to their deployment.
2. There was no current recording of fuel check done on WCC's day-to-day operations. Absence of such means that the organization is ineffective in the monitoring of their processes.
3. There was inconsistency noted on the recording of fuel uplift on the aircraft flight and maintenance logbooks. Several records have been found to have no entries.

## 2.3 Test and Research

### 2.3.1 Aircraft Post-Accident Inspection

During on-site investigation and after recovering the aircraft from the accident site, the following have been conducted:

1. Magnetic chip detector was removed from the oil sump and visually examined for any metal chips and no significant amount of metal chips was noted.
2. Fuel pump filter was removed and visually examined for contaminants that may cause clogging and no contaminants were noted.
3. Approximately one (1) liter of MOGAS was removed from each aircraft fuel tank (RH & LH) and tested utilizing an aviation approved fuel tester (Shell water detector capsule) to determine presence of water on the samples. The test showed negative result for any contamination on both samples.
4. Functional test of the engine ignition system (spark check) was conducted to the involved aircraft engine utilizing an electric starter direct cranking to determine the serviceability of the magneto (CDI). Sparks were noted in all spark plugs during this test and in correct firing order.



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Figure 3 – Fuel testing for possible contaminants

### 2.3.2 Engine Top-Overhaul Inspection

1. An engine top-overhaul inspection based on Rotax 912 Heavy Maintenance Manual was conducted by WCC Repair Station last 17 November 2022. The activity was performed under the presence of the CAAP AAIIB and the following have been established (Ref: WCC Repair Station Engine Inspection Narrative Report):

   A. Internal parts of the engine showed no evidence of any material fatigue, apparent damage nor internal component failure specifically the following:

      a. Cylinders 1 and 3 (RH) including cylinders 2 and 4 (LH) valve rockers are found to be in place and no sign of any broken valve spring.
      b. Pistons number 1 and 3 (RH) including pistons 2 and 4 (LH) are intact and indicates proper combustion from their appearance.
      c. Connecting rods 1 and 3 (RH) including connecting rods 2 and 4 (LH) shows no evidence of bending or break-up and their lateral clearances against the crankshaft are normal. Crankshaft is also freely rotating and there is also no evidence of internal failure.
      d. Cylinders 1,2,3 and 4 were determined to be in good condition and without any sign of scoring or deep scratches on cylinder walls.

   B. No metal shaving nor any debris found on the oil filter element upon examination.



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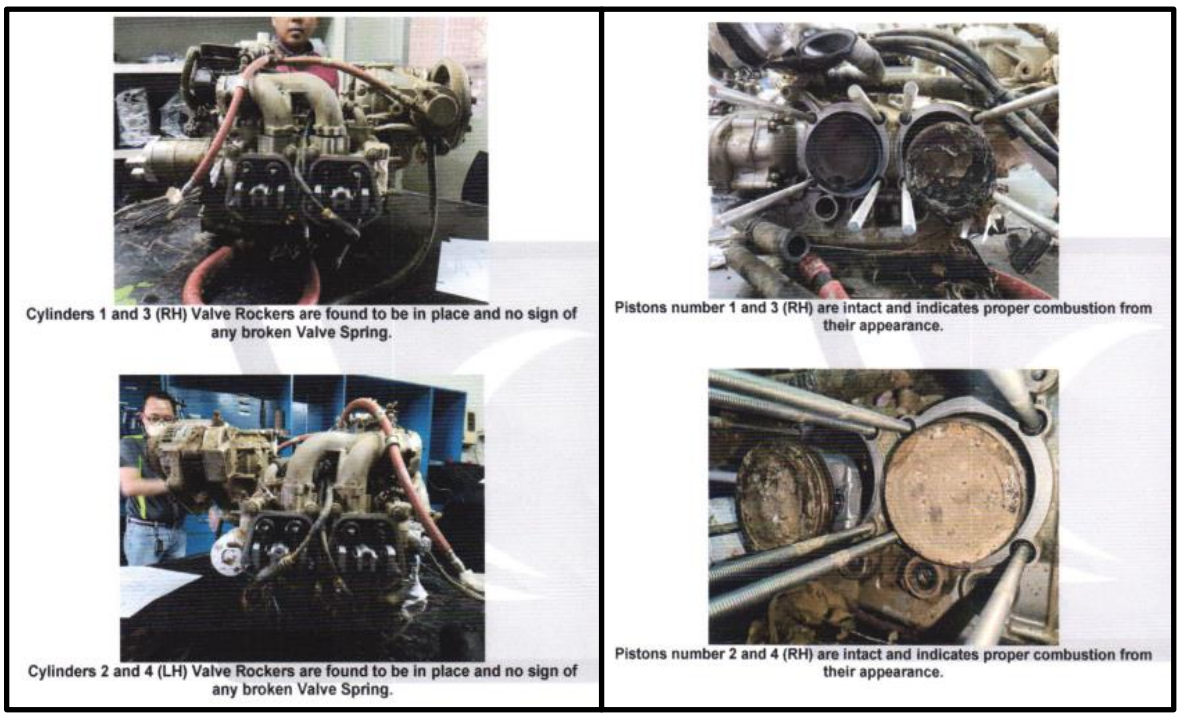


Figure 4 – Engine cylinders and pistons during the top overhaul inspection

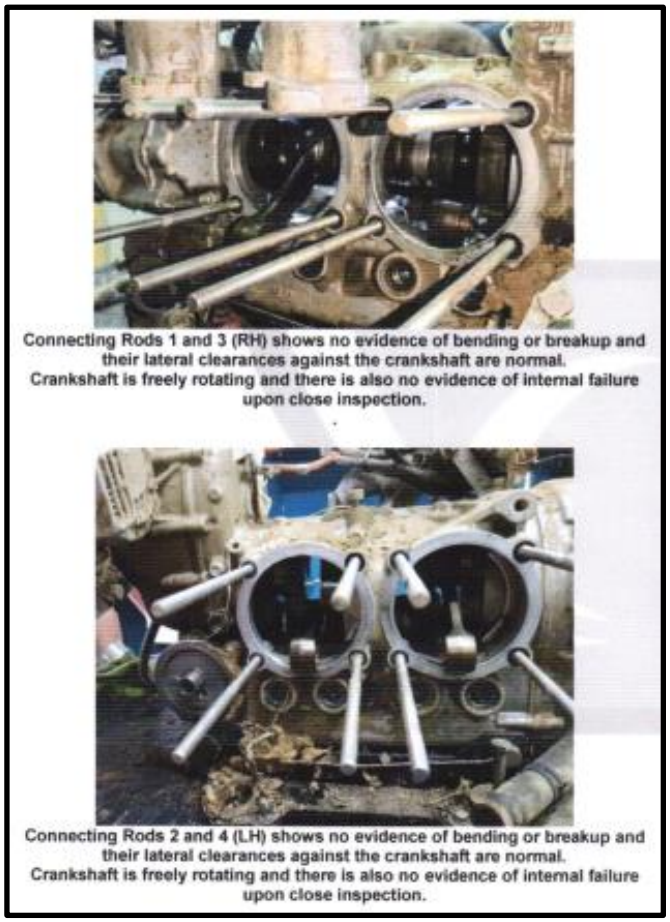


Figure 5 – Engine connecting rods during the top overhaul inspection



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## 3. CONCLUSIONS

### 3.1. Findings

**3.1.1** The aircraft has current Certificate of Registration valid until 09 April 2023.
**3.1.2** The aircraft has current Certificate of Airworthiness valid until 05 November 2022.
**3.1.3** The Flight Instructor has a valid and current Flight Instructor and Commercial Pilot License applicable for the involved type of aircraft.
**3.1.4** Inspection of the engine internal parts showed no evidence of any material fatigue, apparent damage nor internal component failure.
**3.1.5** There were no signs of any blocking particles on the engine oil sump as well as contaminants on the fuel which might have affected the engine performance.
**3.1.6** On the current WCC fuel operations records and processes, the following have been found:

1. The appointed Fuel Manager has no formal training for his position and functions.
2. There were no available records pertaining to the conduct of daily fuel check prior to aircraft fueling/refueling operations.
3. WCC Fuel Operations/Maintenance personnel are not consistent in maintaining the records of their day-to-day activities.

### 3.2 Probable Cause

The results of the post-accident tests and engine top overhaul inspections could not confirm the root cause of the engine degrading performance issue because the tests could not specifically identify the part of the engine that had failed and caused this accident.

## 4. SAFETY RECOMMENDATIONS

As a result of the investigation, no definite or confirmed root cause has been identified for this case. As a result, no specific recommendation will be made that is directly related to the engine performance issue. However, as part of the involved operator's ongoing process improvement, the following safety recommendations are hereby proposed:

For **CAAP-FSIS** to ensure that the Operator:

**a.** Set as a pre-requisite that all personnel performing critical task in the operations i.e. Fuel Manager, undergoes trainings appropriate to his functions.
**b.** Observed proper documentation of process implementation such as but not limited to recording of daily fuel check and aircraft fuel uplift.

**-END-**



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