Republic of the Philippines
CIVIL AVIATION AUTHORITY OF THE PHILIPPINES

# AIRCRAFT ACCIDENT INVESTIGATION AND INQUIRY BOARD

## FINAL REPORT

## RP-C896
## TEXTRON AVIATION
## C152

***OPERATOR: FLITELINE AVIATION SCHOOL INC.***

***TYPE OF OPERATION: FLIGHT TRAINING***

***DATE OF OCCURRENCE MARCH 28, 2025***

***PLACE OF OCCURRENCE: PATUBIG ROAD, PUROK 1, BARANGAY LALANG, PLARIDEL, BULACAN, PHILIPPINES***

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(Textron Aviation/C152, RP-C896 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 the 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.

# FINAL REPORT

**TITLE**: Accident involving a Textron Aviation/C152 type of aircraft with Registry Number RP-C896 operated by Fliteline Aviation School Inc., that experience forced landing following a failure of the engine through – stud bolts that resulted in a loss of engine power at Patubig Road, Purok 1, Barangay Lalang, Plaridel, Bulacan, Philippines on March 28, 2025/1416H local time.

## Notification of Occurrence to National Authority

The notification of accident to AAIIB CAAP was relayed by the Operator of the aircraft to the OIC, AAIIB through the Operation Center-CAAP at 1530H (LOCAL) on March 28, 2025.

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

## Authority Releasing the Report

The Final investigation report was released by Aircraft Accident Investigation and Inquiry Board (AAIIB) and published at the CAAP website on **02 September 2025.**

## Synopsis:

On or about 1416H local time on March 28, 2025, a Textron Aviation/C152 type of aircraft with Registry Number RP-C896, operated by Fliteline Aviation School Inc., sustained substantial damage during a forced landing following a total loss of engine power. The occurrence took place at Patubig Road, Purok 1, Barangay Lalang, Plaridel, Bulacan, Philippines. The aircraft was occupied by a Flight Instructor (FI) and a Flight Instructor Trainee (FIT), both of whom sustained minor injuries. Visual Meteorological Conditions (VMC) prevailed at the time of the occurrence. The Aircraft Accident Investigation and Inquiry Board (AAIIB) determined that the probable cause of the accident was the failure of the engine crankcase through-stud bolts, which led to a loss of engine power.

## LIST OF ACRONYMS AND ABBREVIATIONS

| | | |
|---|---|---|
| AAIIB | : | Aircraft Accident Investigation and Inquiry Board |
| AGL | : | Above Ground Level |
| AMO | : | Approved Maintenance Organization |
| AMOC | : | Approved Maintenance Organization Certificate |
| ARFFS | : | Aerodrome Rescue and Fire Fighting Services |
| ASPH | : | Asphalt |
| ATOC | : | Aircraft Training Organization Certificate |
| CAAP | : | Civil Aviation Authority of the Philippines |
| CPL | : | Commercial Pilot License |
| LCD | : | Licensing and Certification Department |
| FI | : | Flight Instructor |
| FIT | : | Flight Instructor Trainee |
| OFSAM | : | Office of the Flight Surgeon and Aviation Medicine |
| PCAR | : | Philippine Civil Aviation Regulation |
| NM | : | Nautical Miles |
| RPUX | : | ICAO 4 Letter Code for Plaridel Community Airport, Philippines |
| RWY | : | Runway |
| TBO | : | Time Between Overhaul |
| TSN | : | Time Since New |
| VFR | : | Visual Flight Rules |
| VMC | : | Visual Meteorological Condition |

# 1. FACTUAL INFORMATION

| | | |
|---|---|---|
| Aircraft Registration No. | : | RP-C896 |
| Aircraft Manufacturer/Model | : | Textron Aviation/C152 |
| Operator | : | Fliteline Aviation School Inc. |
| Address of Operator | : | Plaridel Airport, Lumang Bayan, Plaridel, Bulacan, Philippines |
| Place of Occurrence | : | Patubig Road, Purok 1, Barangay Lalang, Plaridel, Bulacan, Philippines |
| Date/Time of Occurrence | : | March 28, 2025/1416H/0616 UTC |
| Type of Operation | : | Flight Training |
| Phase of Flight | : | Cruise |
| Type of Occurrence | : | Reciprocating Engine – Non-Mechanical Failure |

## 1.1 History of Flight

At approximately 1416H on March 28, 2025, a Textron Aviation/C152 type of aircraft with Registry Number RP-C896, sustained substantial damage after experiencing a total loss of engine power. This resulted in a forced landing at Patubig Road, Purok 1, Barangay Lalang, Plaridel, Bulacan, Philippines.

The aircraft is being operated by Fliteline Aviation School Inc., based at Plaridel Airport. The aircraft departed at around 1325H from the same airport for the scheduled routine flight instructor training. Onboard the aircraft were the Flight Instructor (FI) seated on the left side and a FI Trainee on the right side.

The crew conducted routine pre-flight checks, and the flight instructor trainee was at the controls during the flight. The aircraft reached Bulakan, Bulacan approximately 6 nautical miles (NM) south of RPUX at an altitude of 2,000 feet AGL. The training involved performing airworks, and the flight initially proceeded without incident. Upon reaching a position 10 NM south of RPUX at 1,500 feet AGL, the crew


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experienced unusual aircraft vibrations accompanied by the smell of burning oil. In response, the Flight Instructor (FI) took control and elected to return to RPUX. The FI requested priority landing and informed the air traffic controller on duty about their situation. To gain additional altitude, the FI applied more power and climbed to 2,000 feet AGL. However, at approximately 5 NM to RPUX, the vibrations intensified, and the engine pressure indication dropped. Approximately half a mile from RPUX, the oil pressure dropped to zero, and the engine seized. The FI attempted two engine restarts, both of which were unsuccessful. Recognizing the imminent loss of power, the FI initiated a forced landing and set the transponder to 7700 to declare an emergency. The aircraft executed a forced landing in a harvested rice field. It touched down approximately 770 meters from the threshold of RWY 17 and rolled approximately 25 meters before colliding with a residential communication wire and an embankment, causing it to overturn. The aircraft came to rest at coordinates 14° 52' 58" N, 120° 50' 52.27" E, on a final heading of 140°. A training flight plan had been filed at RPUX, and visual meteorological conditions (VMC) prevailed throughout the flight.

The aircraft sustained significant damage, including to its right wing, nose landing gear, fuselage, upper and lower engine cowlings, and propeller. Both occupants, the flight instructor (FI) and flight instructor trainee suffered minor injuries. Despite the impact, they were able to exit the aircraft unassisted and were subsequently transported to a hospital for medical evaluation. Responding personnel from the Aerodrome Rescue and Fire Fighting Services (ARFFS) assisted in securing the aircraft and ensuring the safety of the site.

Figure 1: RP-C896 on its final resting position.


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### 1.2 Injuries to Person (s)

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

### 1.3 Damage to Aircraft

The aircraft sustain substantial damage.

### 1.4 Other Damage

The aircraft collided with a residential communication wire.

### 1.5 Personnel Information

#### 1.5.1 Flight Instructor (FI)

| | | |
|---|---|---|
| Gender | : | Male |
| Date of Birth | : | 14 February 1975 |
| Nationality | : | Filipino |
| License | : | 103819 CPL/FI |
| Valid up to | : | 31 October 2026 |
| Type rating | : | Airplane: Single Engine Land C152, C172. PA38-112 |
| Medical Certificate | : | Class I |
| Time on C152 | : | 6,000 + 00 Hours as per pilot logbook |
| Grand Total time | : | 9,400 + 00 Hours as per pilot logbook |

#### 1.5.2 Flight Instructor Trainee (FIT)

| | | |
|---|---|---|
| Gender | : | Male |
| Date of Birth | : | 23 July 1998 |
| Nationality | : | Filipino |
| License | : | 148285 CPL |
| Valid up to | : | 22 August 2028 |
| Type rating | : | Airplane: Single Engine Land C152, C172 |
| Medical Certificate | : | Class I |


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| | | |
|---|---|---|
| Time on C152 | : | 212+ 38 Hours as per pilot logbook |
| Grand Total time | : | 63+ 06 Hours as per pilot logbook |

## 1.6 Aircraft Information

### 1.6.1 Aircraft Data

| | | |
|---|---|---|
| Registration Mark | : | RP-C896 |
| Manufacturer | : | Textron Aviation Inc. |
| Country Of Manufacturer | : | United States of America |
| Type/Model | : | Cessna 152 |
| Operator | : | Fliteline Aviation School Inc. |
| Serial No. | : | 15285438 |
| Date of Manufacture | : | 1982 |
| Certificate of Airworthiness Valid up to | : | 24 February 2026 |
| Certificate of Registration Valid up to | : | 01 September 2029 |
| Number of Crew | : | 2 |
| Number of Passenger Seat | : | 1 |
| Airframe Total Time | : | 24,166+58 Hours |

### 1.6.2 Engine Data

| | | |
|---|---|---|
| Manufacturer | : | Lycoming |
| Type | : | Piston |
| Model | : | 0-235-L2C |
| Serial No. | : | L-13296-15 |
| Time Since New | : | 5,797+44 Hours |
| Time Since overhauled | : | 1,157+34 Hours |

### 1.6.3 Propeller Data

| | | |
|---|---|---|
| Manufacturer | : | Sensenich |
| Type/Model | : | Fixed Pitch 2 Blade/72CKS6-0-54 |
| Serial No. | : | K8431 |
| Time Since New | : | 4,825+04 |

## 1.7 Meteorological Information

Visual Meteorological Conditions prevailed at the time of the occurrence.


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## 1.8 Aids to Navigation

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

## 1.9 Communication

The aircraft was equipped with a standard radio transceiver; communications were carried out between the pilots and RPUX air traffic controller.

## 1.10 Aerodrome Information

Plaridel Community Airport (RPUX) is operated by the Civil Aviation Authority of the Philippines, and is listed in the CAAP approved aerodrome facility data as well the Philippine Aeronautical Information Publication (AIP as of May 2023).

### 1.10.1 General Information

| | | |
|---|---|---|
| Aerodrome Name | : | Plaridel Community Airport – RPUX |
| ARP coordinates and site at AD | : | 145329.5445N<br>1205111.1410E. |
| Aerodrome Operator address, telephone, telefax, telex, AFS | : | Civil Aviation Authority of the Philippines<br>Plaridel Airport, Plaridel<br>3004 Bulacan Province<br>Phone: (044) 795-0637 / (02) 879-9122 to 9125. |
| Types of traffic permitted (IFR/VFR) | : | VFR |
| AD category for fire fighting | : | CAT IV. One (1) fire truck - SIDES VMA28 and land rover. |
| Apron surface and strength | | Surface: PCCP.<br>Strength: Nil. |
| Taxiway width, surface and strength | : | Width: 9M.<br>Surface: ASPH.<br>Strength: Nil. |
| Aerodrome Obstacles | : | 17/35 Trees and houses. Water tank, Meralco post Balching plant. Exercise caution during landing and take-off. |
| ATS Communication Facilities | : | Plaridel Control Tower |
| Frequency/Operation | : | 122.4MHZ, 5447.5KHZ, 3834KHZ / 2300 - 0900 |
| Airspace classification | : | Class B |
| Runway Direction | : | 17/35 |
| Runway Length | : | 900 Meters |


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| | | |
|---|---|---|
| Runway Width | : | 30 Meters |
| Surface | : | PCN 8 F/C/Y/U/ASPH |

## 1.11 Flight Recorders

The aircraft was not equipped with any flight recorders and existing CAAP regulation does not require it.

## 1.12 Wreckage and Impact Information

The aircraft initially touched down on its main gears and rolled approximately 25 meters before colliding with a residential communication wire and an embankment, causing it to overturn. The aircraft came to rest at coordinates 14° 52' 58" N, 120° 50' 52.27" E, on a final heading of 140°.

The aircraft sustained significant damage, including to its right wing, nose landing gear, fuselage, upper and lower engine cowlings, and propeller. Both occupants, the flight instructor (FI) and flight instructor trainee, suffered minor injuries. Despite the impact, they were able to exit the aircraft unassisted and were subsequently transported to a hospital for medical evaluation. Responding personnel from the Aerodrome Rescue and Fire Fighting Services (ARFFS) assisted in securing the aircraft and ensuring the safety of the site.

## 1.13 Medical and Pathological Information

Following the incident, both occupants underwent medical and drug tests, which revealed no significant medical findings. The Office of the Flight Surgeon and Aviation Medicine (OFSAM) also conducted a post-incident medical examination and there was no medical impediment that hindered both pilot's fitness to fly.

## 1.14 Fire

No evidence of post impact fire was noted during on-site investigation.

## 1.15 Search and Survival Aspects

Both occupants egressed safely on their own after securing the aircraft and was able to inform the operator of the incident. Immediately, the company emergency response plan was activated. The Aerodrome Rescue and Fire Fighting Services arrived on the scene after 20 minutes.


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## 1.16 Test and Research

The engine was removed from the aircraft and brought to the operator's hangar last March 29, 2025. A teardown inspection by the operator's AMO and witnessed by the AAIIB investigator was conducted on the engine. It was determined that the engine failure was traceable to the breakage of the crankcase through stud bolts at cylinder #2. This breakage led to abnormal vibration of the engine, which progressively caused structural-stress and eventual cracking of the crankcase.

## 1.17 Organization and Management Information

### 1.17.1 Operator

Fliteline Aviation School Inc., has an Aircraft Training Organization Certificate (ATOC) #2006-99 valid until October 21, 2026 authorized to perform Flight and Ground training operations that provides private pilot course, commercial pilot course, instrument rating course, flight instructor course and refresher for single/multi engine land services. Fliteline Aviation School Inc., flight operation is located at Plaridel Community Airport, Lumang Bayan, Plaridel, Bulacan, Philippines. The aircraft RP-C896, is listed on their ATOC Operations specification.

### 1.17.2 Maintenance

Fliteline Aviation Services Inc., is a holder of an Approved Maintenance Organization Certificate (AMOC) # AMO-66-07 empowered to operate as an Approved Maintenance Organization in compliance with the requirements of the Civil Aviation Regulation (PCAR) Part 6 with official address at Plaridel Community Airport, Lumang Bayan, Plaridel, Bulacan, Philippines. The maintenance function of RP-C896 is being undertaken by Fliteline Aviation Services Inc., Repair Station.

# 2. ANALYSIS

## 2.1 General

The aircraft was on its second flight of the day. The crew conducted routine pre-flight checks with the flight instructor trainee acting as the pilot flying for the flight. The aircraft departed at around 1325H from Plaridel community airport for the scheduled routine flight instructor training. The crew experienced unusual aircraft vibrations accompanied by the smell of burning oil. In response, the flight instructor (FI) took over as pilot flying and initiated a return to RPUX. The FI requested priority landing and informed the air traffic controller on duty about their situation then the aircraft completely lost its power. The operator recovered the aircraft after the CAAP-AAIIB investigator finished his on-site investigation.


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## 2.2 Human Factors

### 2.2.1 Flight Crew

The Flight Instructor (FI) and Flight Instructor Trainee (FIT) both held valid licenses issued by the Licensing and Certification Department (LCD), authorizing them to operate the specific type of aircraft involved. The occurrence flight was the second sortie of the day for the FI and the first for the FI Trainee. Pre-flight checks did not reveal any aircraft abnormalities, as confirmed by both pilots. During the flight, the crew executed a reasonably controlled forced landing; however, due to the unavailability of a suitable landing area, they were constrained to utilize the most viable terrain option within visual range.

## 2.3 Operational Factor

The FI reported that during a training flight involving airwork exercises for instructor training and flight time accumulation, a burning oil odor was detected in the cockpit. In response, the flight crew elected to return to RPUX and initiated a climb to 2,000 feet AGL to increase available altitude as a precautionary measure. Upon reaching the selected altitude, the crew observed abnormal engine vibrations. The FI assumed control of the aircraft, and shortly thereafter, the vibrations intensified, culminating in a complete loss of engine power. The FI attempted two engine restart procedures, both of which were unsuccessful. Consequently, the FI executed a forced landing onto an open, recently harvested rice field. The aircraft came to rest in an inverted position. An AirNav RADAR depiction of Flight Radar 24 shows the flight path covered by RP-C896 during the flight from RPUX until it made the forced landing (Figure 2).


Figure 2: RP-C896 flight path as per Flight radar 24.


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### 2.3.1 The Engine Teardown Inspection

The engine was removed from the aircraft and transported to the operator's authorized repair station on March 29, 2025. According to the engine teardown report of the same date, Cylinder No. 2 was found to have separated from the crankcase (Figures 3 and 4d). Additionally, the left half of the crankcase exhibited severe structural failure, having fractured into three distinct sections (Figures 4a, 4b, and 4c). The section shown in Figure 4c remained partially attached to the engine assembly but became fully detached and fell onto the engine cowling during aircraft recovery operations at the accident site.

Figure 3: Detached Cylinder # 2 housing.

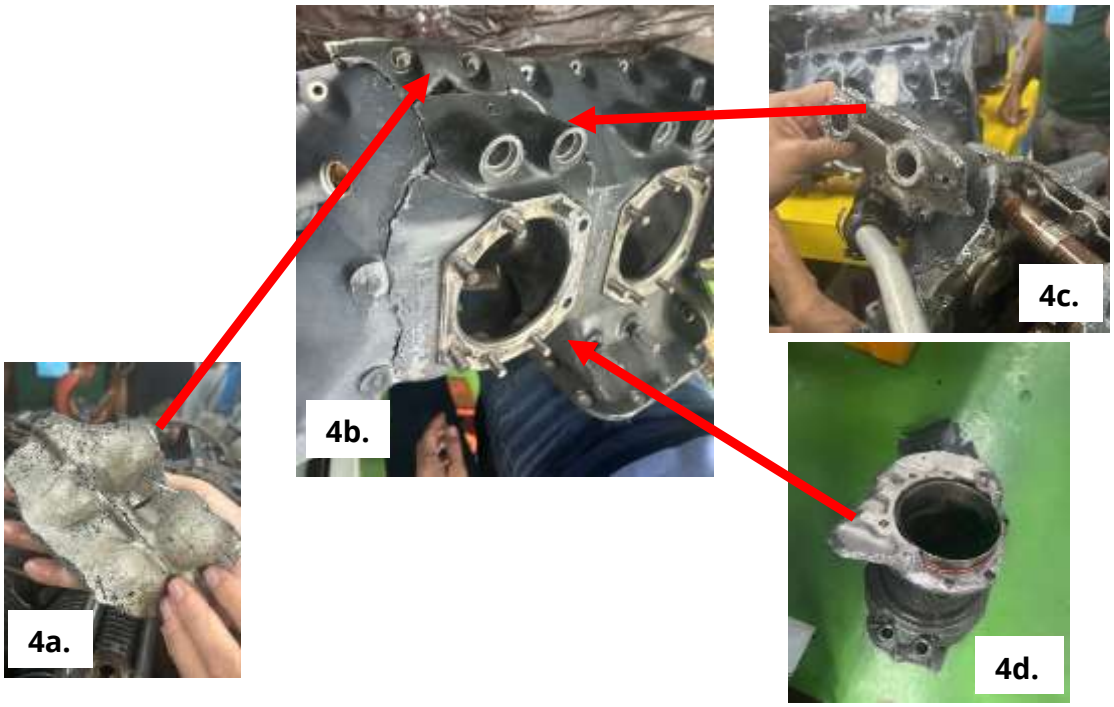


Figure 4: The Crankcase left half.


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The failure of the No. 2 cylinder through-stud bolts (Figure 5) appears to be the initiating event, subsequently leading to progressive and random failures of associated engine components and hardware.

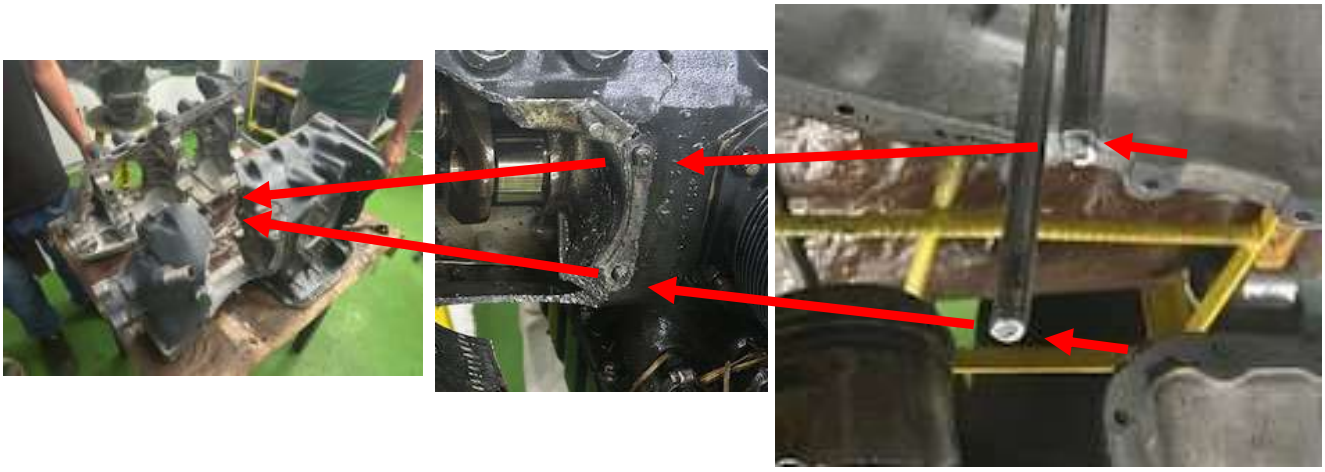

Figure 5: The failed crank case thru Stud Bolts on cylinder #2.

### 2.3.2 Failure Sequence

The Flight Instructor (FI) reported that during a training flight involving airwork exercises conducted for instructor qualification and flight time accumulation, a burning oil odor was detected in the cockpit. The engine failure sequence began during this phase. As a precautionary measure, the crew initiated a climb to 2,000 feet AGL to increase altitude in anticipation of a potential worsening of the situation. Upon reaching the selected altitude, the crew observed abnormal engine vibrations. The FI assumed control of the aircraft, and shortly thereafter, the engine vibrations intensified, culminating in a complete loss of engine power.


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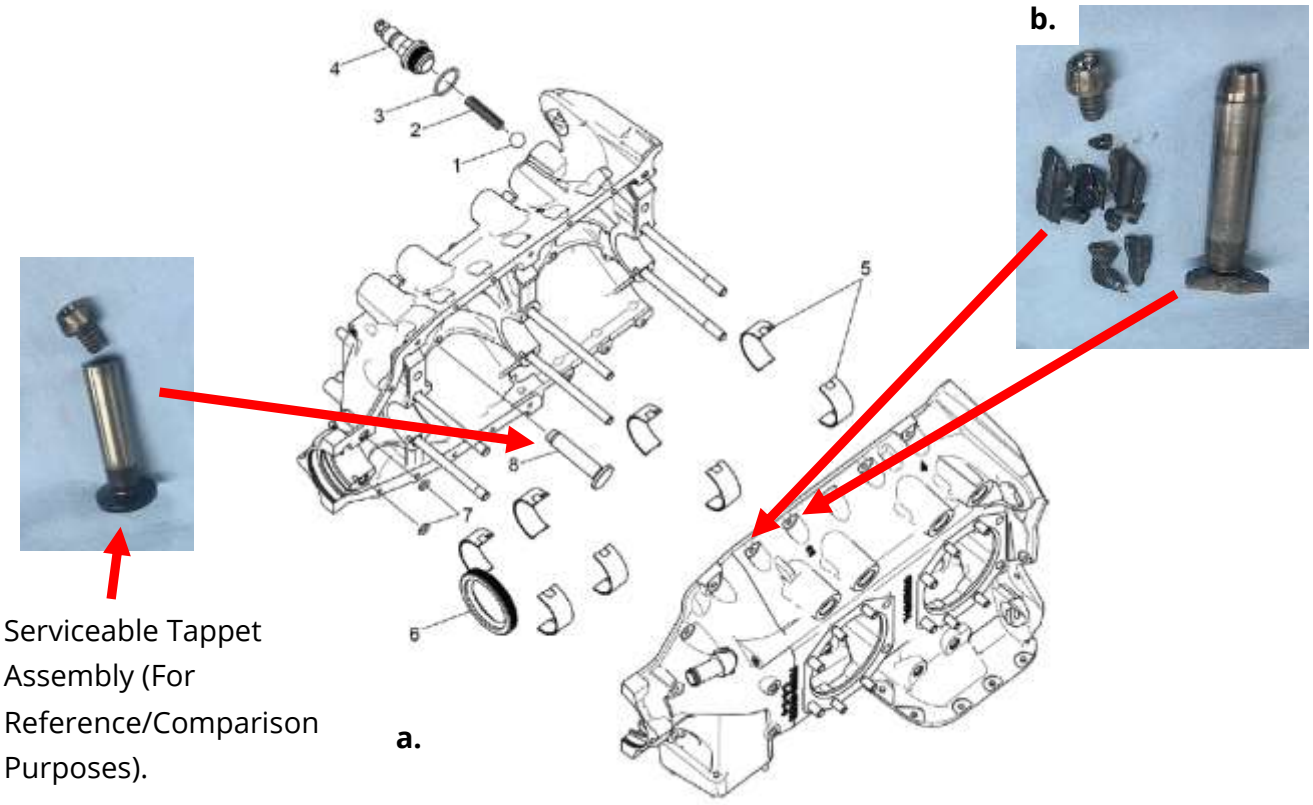


Figure 6: The Tappet Assembly.

**During the teardown inspection, the following failure modes were identified:**

1. The Crank case thru Stud Bolts on cylinder #2 failed (Figure 5) one bolt was broken and the other lost its nut while the aircraft was on flight. As the Stud bolts received high amount of stress from the combustion, it created a crack on the left side half of the crank case around cylinder #2 (Figure 4 b). The engine oil started to leak out that is why the occupants smelled the burning oil inside the aircraft.

2. One of the occupants added power to climb to a higher altitude, this entails the crack to progressed and as space between the crankcase widens, more engine oil was spilled out. The Push Rod Assembly (Figure 7) together with the Tappet assembly (Figure 6) misaligned with the spinning camshaft (Figure 8).


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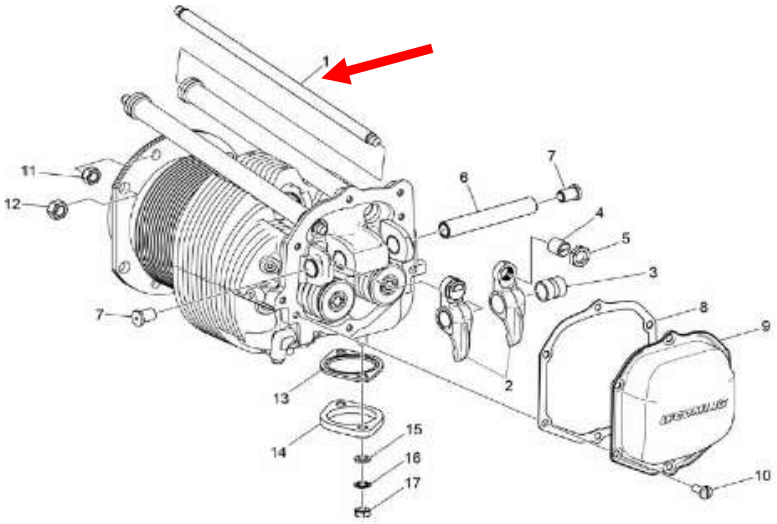


Figure 7: The Push Rod Assembly.

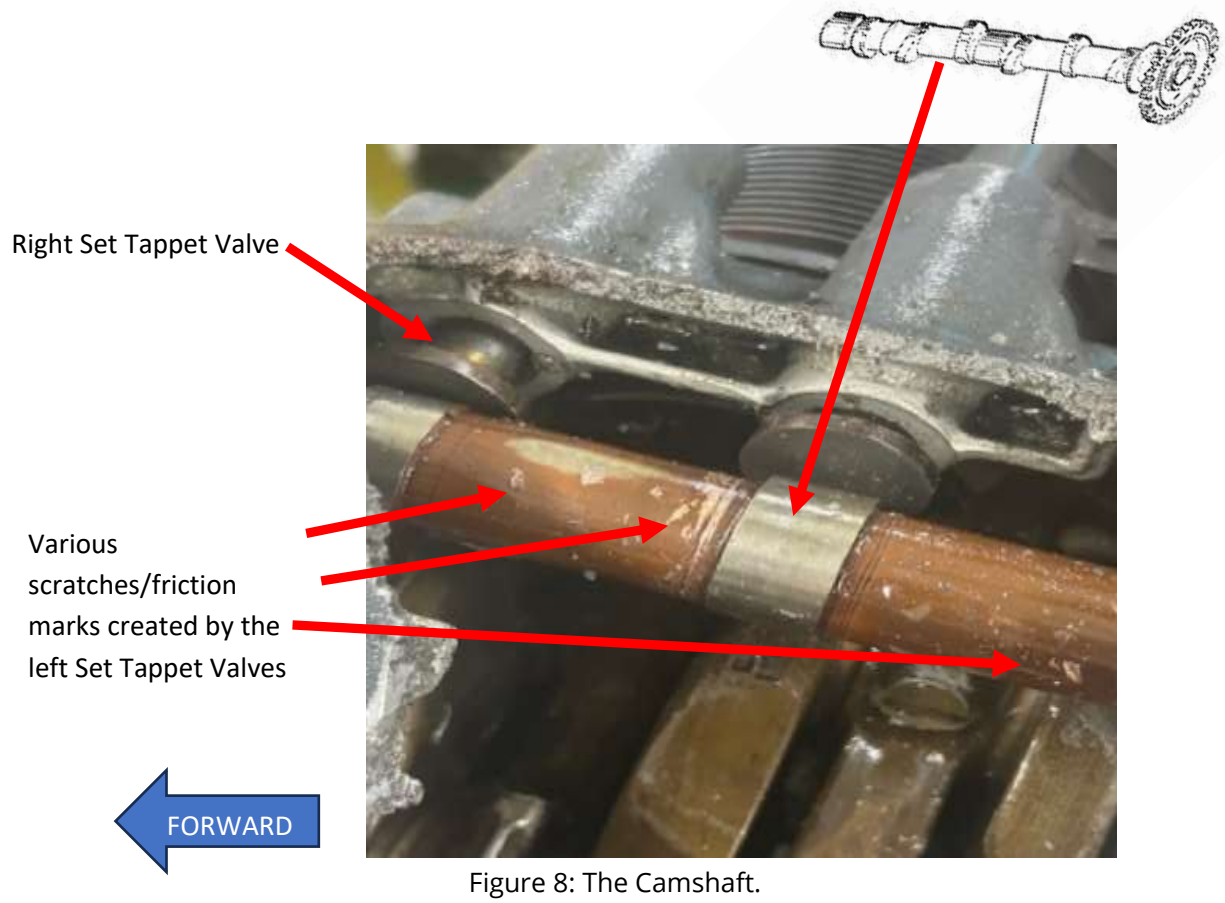


Figure 8: The Camshaft.


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3. The misalignment of both left Tappets from the push rod and the camshaft knocked /contact damage with the crankcase forward upper attaching bolt parts (Figure 9 b). This fragment was still attached to the engine as the aircraft was recovered from the wreckage site. Then by ejecting both tappets out of its chamber. With the engine oil depleting, sudden rise of temperature is expected. This high-temperature is evident in the discoloration of the connecting rods (Figure 10).

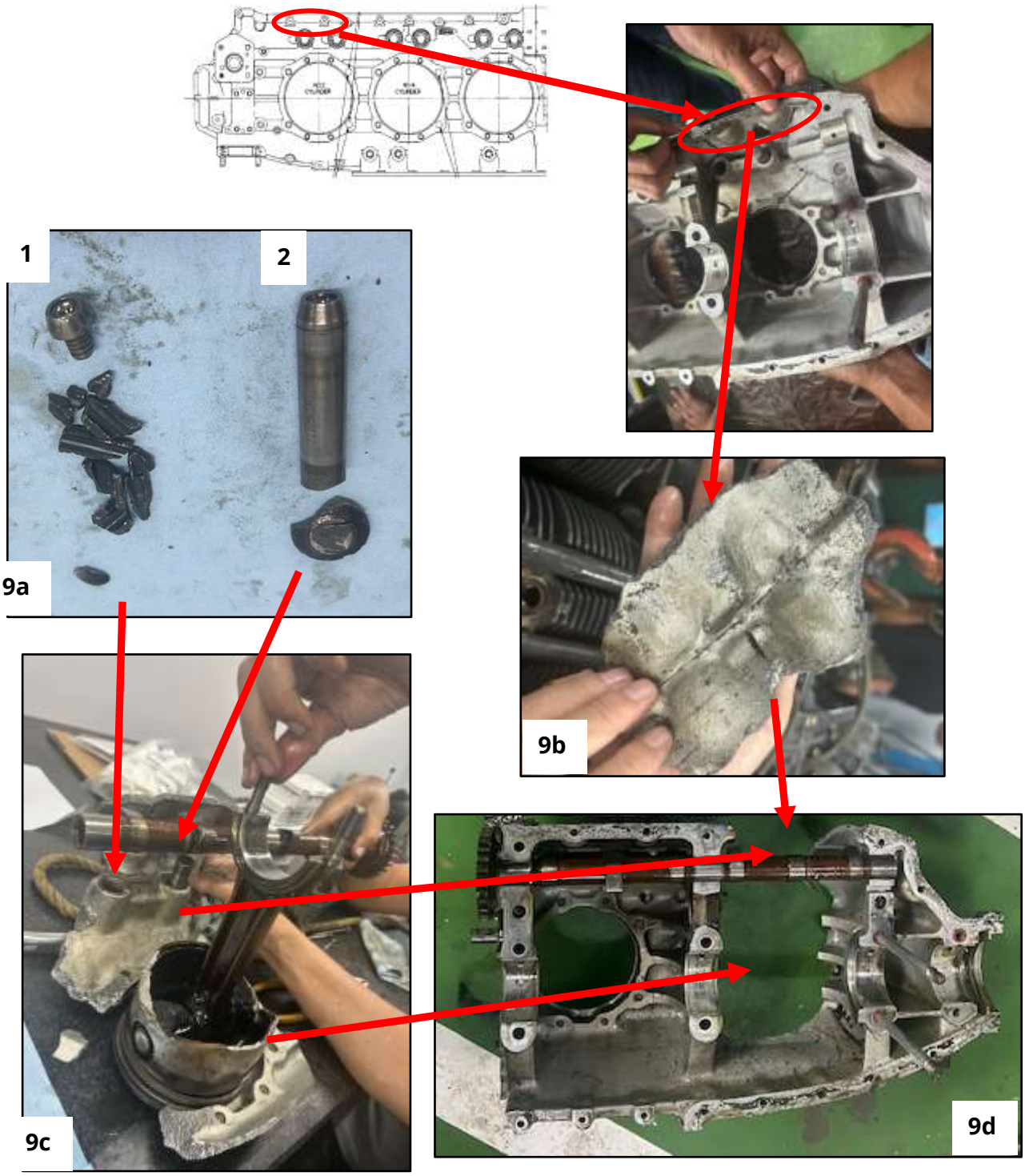


Figure 9: The misalignments.


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4. The cylinder number 2 fractured at its area and had an indication of extreme heat with its connecting rod that produced discoloration of the components (Figure 11a). The cylinder came in contact with the tappet valves in which created friction, with the crankcase (Figure 9) and with the engine oil depleted the engine seized to operate. The oil sump was removed and found some materials of the tappet assembly, parts of the cylinder valve #2 together with other metal chips.

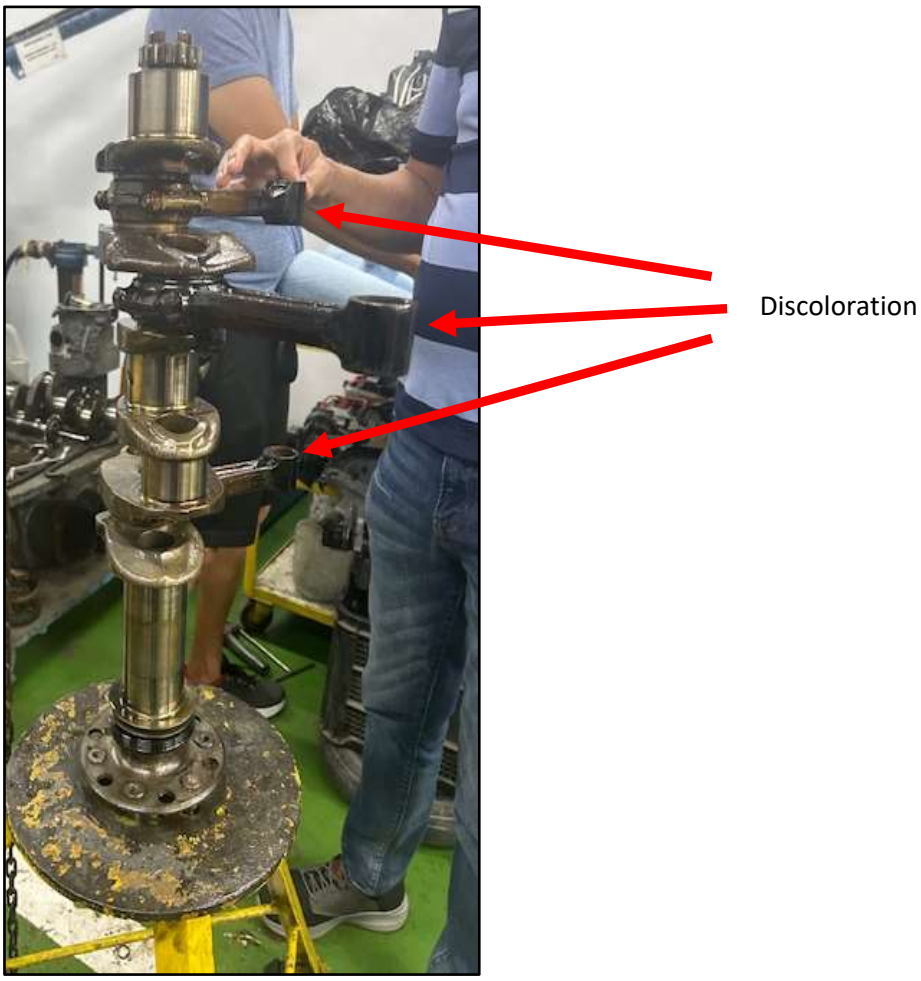


Figure 10: The crankshaft with its Connecting Rods.

5. The ejected tappet valves came to rest on both sides of the cylinder valve (as representation, figure 11c, 11d) where they are broken apart by mechanical action of the cylinder valve, connecting rod and the crankshaft (Figure 11 a & 11b).


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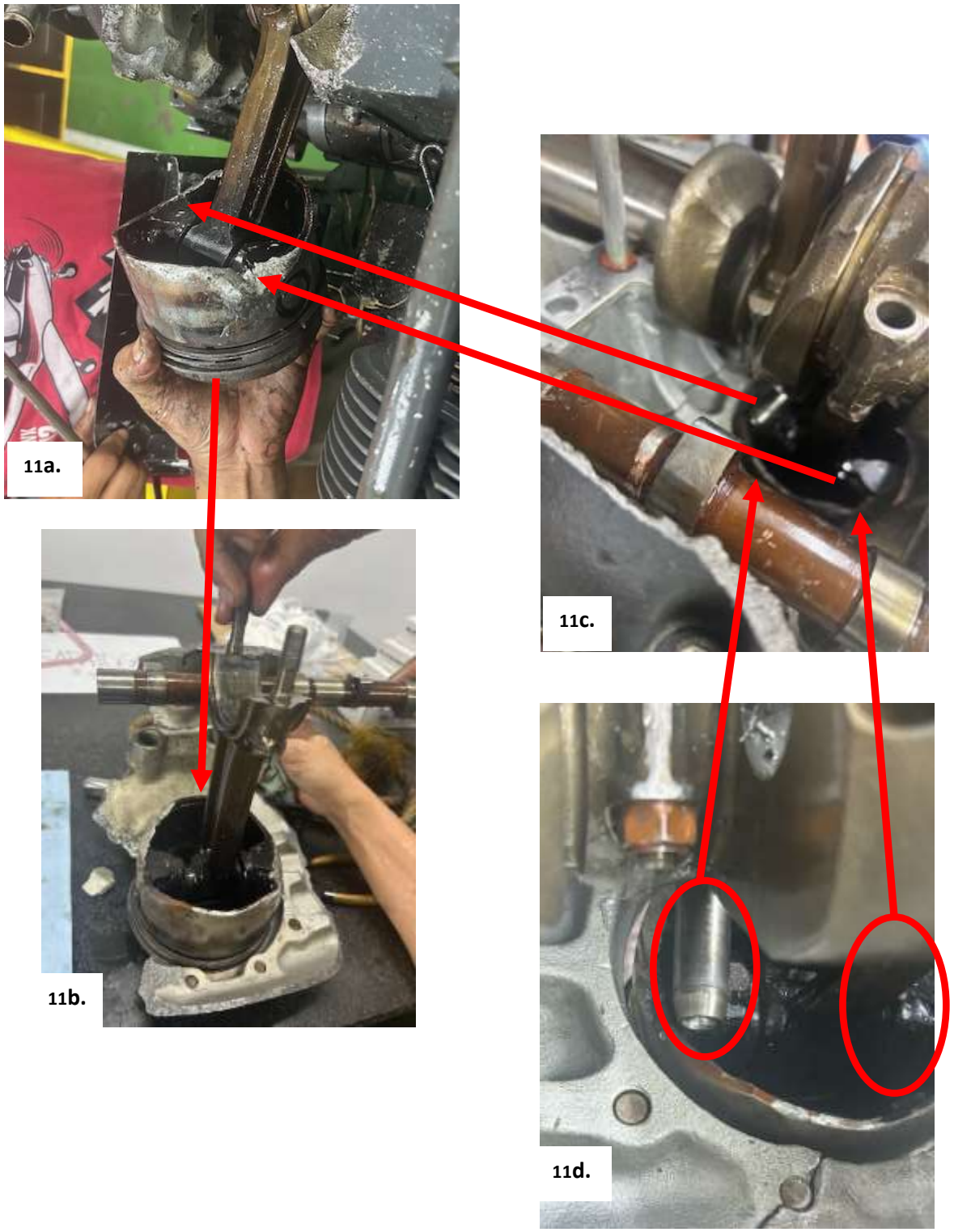


Figure 11: The Tappet Valves.


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Figure 12: AMO Maintenance Release.

## 2.4 Organizational Factor

### 2.4.1 Aircraft Maintenance

Available documentation indicates that the operator also owns the Approved Maintenance Organization (AMO) responsible for the aircraft's maintenance. All engine components utilized during the most recent overhaul, conducted between April 27 and May 12, 2023, were supplied by Fliteline Aviation Services Inc., with serviceable tags issued on June 5, 2023 (Figure 12). There is no recorded evidence of any subsequent comprehensive inspection, teardown, or major maintenance action performed on the engine throughout its operational service period following the said overhaul.


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The aircraft was reported to be in serviceable condition and actively utilized for flight training operations. Both the engine logbook and the corresponding aircraft maintenance logbook were available and reviewed for verification. The engine's operational history was generally uneventful, with routine inspections and maintenance performed at prescribed intervals. On November 8, 2024, at a Total Time Since New (TSN) of 5,701.56 hours, the engine was subjected to an airworthiness inspection, the results of which were satisfactory, allowing the engine to remain in service.

Following the recovery of the aircraft, investigators from the CAAP-AAIIB conducted a site visit to the operator's maintenance facility. It was observed that the AMO possessed the appropriate tooling, equipment, and documentation necessary to perform maintenance services on the subject aircraft type.

### 2.4.2 Organizational Oversight on Engine Fatigue

In the context of the investigation, it was noted that the operator maintains a fleet that extensively utilizes Lycoming O-235-L2C engines, with aircraft RP-C896 serving as one of the primary training platforms. All Avco Lycoming engines incorporate bolts and long through-studs that traverse the crankcase halves, serving both to maintain crankcase integrity and to secure the cylinders to their respective mounting decks.

The subject engine's through-stud bolts experienced overstress conditions attributed to engine vibrations, leading to the initiation and propagation of an undetected fatigue crack. Current maintenance inspection criteria only mandate detailed examination of these studs when the engine is fully disassembled or when all cylinders are removed. This introduces a continued risk of fatigue cracks developing and remaining undetected between scheduled inspections. Such failures may occur prior to the next Time Between Overhaul (TBO) interval, typically set at approximately 2,000 operating hours.

This event represents the first recorded instance of crankcase through-stud bolt failure within the operator's fleet. As such, it appears that the operator's AMO did not anticipate or detect the progressive fatigue in the affected engine components.

### 2.4.3 Failure Sequence and Contributing Factors

The sequence of failure suggests a classic case of progressive fatigue failure initiated by overstressed crankcase through-stud bolts, exacerbated by high-cycle engine vibrations common in-flight training environments. The loss of torque retention in one stud and fracture of the other likely compromised the


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clamping force needed to secure Cylinder No. 2, allowing micro-movements during combustion cycles that initiated crack propagation in the crankcase.

The operator's reliance on standard inspection intervals—without intermediate non-destructive inspection or bolt re-torque checks—may have allowed the fatigue to go undetected, especially since maintenance guidelines do not mandate inspection of through-studs unless the engine is fully disassembled. This highlights a gap between operational usage (i.e., high-frequency training flights) and the maintenance program's ability to proactively detect fatigue-sensitive failures.

From a systems safety perspective, this occurrence points to the importance of aligning maintenance practices with actual engine stress profiles rather than relying solely on hour-based intervals. Implementing condition-based monitoring or incorporating supplemental inspection criteria for high-stress components such as through-studs could serve as an effective preventive measure.

The operator should adopt enhanced inspection protocols and implement preventive maintenance measures, particularly focused on the crankcase through-stud bolts, to mitigate the risk of recurrence.

## 3. CONCLUSIONS

### 3.1 Findings

- **a.** Both pilots were trained and qualified on the Textron Aviation Inc. Cessna C-152 aircraft.
- **b.** Both pilots held valid licenses and current medical certificates issued by the Licensing and Certification Department (LCD) and the Office of Flight Surgeon and Aviation Medicine (OFSAM), Civil Aviation Authority of the Philippines (CAAP), respectively.
- **c.** Visual Meteorological Conditions (VMC) prevailed at the time of the occurrence.
- **d.** The aircraft was properly released for flight on the day of the occurrence in accordance with established procedures.
- **e.** The aircraft held valid Certificates of Airworthiness and Registration at the time of the occurrence.
- **f.** All engine replacement parts installed during the last overhaul were supplied by the operator.
- **g.** The engine failure occurred during a training flight involving airwork exercises, resulting in a complete loss of power.
- **h.** The engine's No. 2 cylinder through-stud bolts experienced structural failure due to undetected fatigue, leading to misalignment of internal engine components and subsequent engine seizure.


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**i.** The crankcase exhibited significant cracking and fragmentation in the area surrounding Cylinder No. 2, consistent with overstress and progressive fatigue damage.

**j.** The aircraft came to rest inverted following a forced landing in an open, harvested rice field after complete power loss.

### 3.2 Probable Cause

#### 3.2.1 Primary Cause Factor

**a.** The failure of the engine through-stud bolts led to the misalignment of internal engine components, ultimately resulting in a complete loss of engine power. (Material Factor).

## 4. SAFETY RECOMMENDATIONS

**4.1** Following the completion of the safety investigation, the Aircraft Accident Investigation and Inquiry Board proposes the following safety recommendations to the Fliteline Aviation School Inc., through the regulatory oversight of the Flight Standards Inspectorate Service (FSIS):

**4.1.1** For the Fliteline Aviation School Inc., to enhance their Inspection protocols for engine through-stud bolts.

The Operator should Develop and implement a supplemental inspection program focused on critical engine components such as crankcase through-stud bolts, especially for Lycoming O-235 series engines. This may include non-destructive testing (NDT) or visual inspections at intermediate intervals prior to TBO.

**4.1.2** For the Fliteline Aviation School Inc., to revise their maintenance procedures and inspection schedules.

The Operator should revise their existing maintenance procedures to include early detection of fatigue-related failures in the crankcase and cylinder attachment hardware. This should include conditional inspections following abnormal engine vibration reports or oil smell events.

## 5. SAFETY ACTION

**5.1** Following the occurrence, the operator conducted an Information Drive and Safety Stand Down Meeting on April 11, 2025, held at Aero Stop, Plaridel, Bulacan from 0800H to 1200H. The activity was observed by a representative from the Civil Aviation Authority of the Philippines (CAAP). The meeting formed part of the operator's internal


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safety actions and served as a proactive initiative to identify and address potential organizational issues, operational hazards, and maintenance-related concerns. The forum involved both the Flight Training Department and the Maintenance Provider, aiming to reinforce safety awareness, enhance reporting culture, and review procedures related to early detection of mechanical anomalies and fatigue-related engine failures. (App A1-A2).

**-----END-----**


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Safety Stand Down Program Flow
11 April 2025 Aerostop Hotel and Restaurant

**Program Flow**

8:30 AM – 9:00 AM
Registration of Participants

9:00 AM – 9:10 AM
Opening Remarks and Introduction to the Safety Stand Down
Facilitator: Head of Training, Capt. Jeremy Perlada

9:10 AM – 9:40 AM
Review of Incident: RP-C1085
Presented by: Safety Manager, Capt. Arlo Perlada

9:40 AM – 10:10 AM
Review of Incident: RP-C896
Presented by: Safety Manager, Capt. Arlo Perlada

10:10 AM – 10:30 AM
Snack Break

10:30 AM – 11:00 AM
Discussion: Mitigation Measures and Preventive
Actions Moving Forward Facilitator: Sir Pong Pastrana,
Maintenance Manager

11:00 AM – 11:50 AM
Open Discussion: Safety Concerns, Hazards, and Sharing of Best Practices
Moderated by: Capt. Arlo Perlada, Safety Manager

11:50 AM – 12:00 PM
Closing Remarks and Conclusion of Safety Stand Down
Speaker: Quality Manager, Capt. Gio Salazar

**Witness by:** **CAPT. ERIC ORTEGA**
CAAP Representative

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