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-C4623
TEXTRON AVIATION INC., C152

OPERATOR: PRECISION FLIGHT CONTROLS PHILIPPINES, INC.

TYPE OF OPERATION: FLIGHT TRAINING

DATE OF OCCURRENCE: SEPTEMBER 17, 2021

PLACE OF OCCURRENCE: PLARIDEL HEIGHTS SUBDIVISION, MALOLOS ROAD, BAGONG BAYAN, PLARIDEL, BULACAN, PHILIPPINES

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(Textron Aviation Inc., C152, RP-C4623 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.

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FINAL REPORT

TITLE: An accident involving a Textron Aviation Inc., Cessna C152 type of aircraft with Registry Number RP-C4623 owned and operated by Precision Flight Controls Philippines, Inc., that experienced total loss of engine power at Plaridel Heights Subdivision, Malolos Road, Bagong Bayan, Plaridel, Bulacan, Philippines on September 17, 2021 at about 0820H/0820UTC

Notification of Occurrence to National Authority

The notification of accident to AAIIB CAAP was relayed by the Operator of the aircraft at 1000H (LOCAL) on September 17, 2021.

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 on the CAAP website on **29 November 2023.**

Synopsis:

On September 17, 2021 at about 0820H, a Textron Aviation Inc., Cessna C152 type of aircraft with Registry Number RP-C4623 operated by Precision Flight Controls Philippines, Inc., experienced total loss of engine power at Plaridel Heights Subdivision, Malolos Road, Bagong Bayan, Plaridel, Bulacan, Philippines. The Flight Instructor got out of the aircraft unharmed while the Student Pilot sustained bruises, however the aircraft sustained minor damage as a result of the incident. Visual Meteorological Condition (VMC) prevailed at the time of the incident. The cause of the occurrence was attributed to the presence of water in the engine fuel system that resulted in engine failure.

LIST OF ACRONYMS AND ABBREVIATIONS

AAIIB	:	Aircraft Accident Investigation and Inquiry Board
AMO	:	Approved Maintenance Organization
ATO	:	Aircraft Training Organization
ATOC	:	Aircraft Training Organization Certificate
CAAP	:	Civil Aviation Authority of the Philippines
CFR	:	Crash Fire Rescue
COA	:	Certificate of Airworthiness
COR	:	Certificate of Registration
CPL	:	Commercial Pi lot License
FI	:	Flight Instructor
ICAO	:	International Civil Aviation Organization
MIA	:	Manila International Airport
PCAR	:	Philippine Civil Aviation Regulation
RPUX	:	Plaridel Community Airport
SP	:	Student Pilot
SPL	:	Student Pilot License
ST	:	Street
STC	:	Supplementary Technical Certificate
TWY	:	Taxiway
VFR	:	Visual Flight Rules
VMC	:	Visual Meteorological Condition

1. FACTUAL INFORMATION

Aircraft Registration No.	:	RP-C4623
Aircraft Type/Model	:	Textron Aviation Inc., Cessna C152
Operator	:	Precision Flight Controls Philippines, Inc.
Address of Operator	:	Unit 3B Building B, Broadland Place MIA Road corner Mayuga St., Tambo, Parañaque City, Philippines
Place of Occurrence	:	Plaridel Heights Subdivision, Malolos Road, Bagong Bayan, Plaridel, Bulacan, Philippines
Date/Time of Occurrence	:	September 17, 2021 at about 0820H/0820UTC
Type of Operation	:	Flight Training
Phase of Flight	:	Take-off
Type of Occurrence	:	Reciprocating engine – fuel starvation

1.1 History of Flight

On or about September 17, 2021, a Textron Aviation Inc., Cessna C152 type of aircraft with Registry Number RP-C4623 sustained substantial damage following a forced landing due to a loss of engine power after take-off. The aircraft settled 560 meters from the threshold of Runway 17 at Plaridel Community Airport, Philippines. The aircraft is being operated by Precision Flight Controls Philippines, Inc., as a training flight.

The Flight Instructor (FI) and the Student Pilot (SP) vacated the aircraft with minor bruises as a result of ground impact and substantial damage sustained by the aircraft. Visual meteorological conditions prevailed at the time of the occurrence.

The aircraft took off normally, but just after it was airborne, it suddenly descended towards the unoccupied residential lot near the airport. Plaridel Airport Air Traffic Controller immediately dispatched an airport Crash Fire Rescue (CFR) unit to help secure the aircraft.

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Figure 1 - Aircraft's final resting point.

1.2 Injuries to Person (s)

Injuries	Crew	Passengers	Others	TOTAL
Fatal	0	0	0	**0**
Serious	0	0	0	**0**
Minor	0	0	0	**1**
None	0	0	0	**1**

1.3 Damage to Aircraft

The aircraft sustained substantial damage.

1.4 Other Damages

There was no other damage reported.

1.5 Personnel Information

1.5.1 Flight Instructor (FI)

Gender	:	Male
Date of Birth	:	January 17, 1995
Nationality	:	Filipino
License	:	123078-CPL/FI
Valid up to	:	October 30, 2025

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Type rating	:	Airplane: Single Engine Land-Instrument-C152, C172.
Medical Certificate Valid up to	:	Class 1 valid until October 03, 2022
Time on Aircraft	:	1,300+35 Hours
Grand Total time	:	1,600+35 Hours

1.5.2 Student Pilot (SP)

Gender	:	Male
Date of Birth	:	March 16, 1995
Nationality	:	Filipino
License	:	149645-SPL
Valid up to	:	October 07, 2021
Type rating	:	Single Engine Land-C152
Medical Certificate Valid up to	:	October 07, 2021
Time on Aircraft	:	45+30 Hours as per Pilot logbook
Grand Total time	:	45+30 Hours as per Pilot logbook

1.6 Aircraft Information

The Cessna 152 is an American two-seat, fixed-tricycle-gear, general aviation airplane, used primarily for flight training and personal use. It was based on the earlier Cessna 150 incorporating a number of minor design changes and a slightly more powerful engine with a longer time between overhaul.

1.6.1 Aircraft Data

Registration Mark	:	RP-C4623
Manufacturer	:	Textron Aviation Inc.
Country of Manufacturer	:	USA
Type/Model	:	Textron Aviation Inc./ Cessna C152
Operator	:	Precision Flight Controls Philippines Inc.
Serial No.	:	15224623
Date of Manufacture	:	1981
Certificate of Airworthiness valid up to	:	January 16, 2021(Extended Validity thru CAAP MC# 10-2020 Dated13March2020)
Certificate of Registration valid up to	:	October 20, 2019 (Extended Validity thru CAAP MC# 10-2020 Dated13March2020)
Category	:	Utility
Number of Aircrew	:	2
Airframe total time	:	10,429+44 Hours

1.6.2 Engine Data

The Lycoming O-235 is a family of four-cylinder, air-cooled, horizontally opposed piston aircraft engines that produce 100 to 135 hp (75 to 101 kW), derived from the earlier O-233 engine. The engine has variants of C1, C1A, C1B, C1C, C2A, C2B, C2C, E1, E2A,

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E2B, F1, F1B, F2A, F2B, G1, G1B, G2A, H2C, J2A, J2B, K2A, K2B, K2C, L2A, L2C, M1, M2C, M3C, N2A, N2C, P1, P2A, P2C and P3C.

Manufacturer	:	Avco-Lycoming
Type	:	Piston
Type/Model	:	Carburetor/ O-235-N2C (with STC mods)
Engine SN#	:	L-14692-15
Engine total time	:	1,152+04 Hours as per aircraft logbook

1.6.3 Propeller Data

Sensenich Fixed Pitch/ 72CKS6-0-54 is an Aluminum Propeller was designed for use on the Lycoming O-235 engine. This propeller has become a favorite of Cessna 152 owners. This blade was designed for in aircraft with a speed range of 80 – 130 MPH.

Manufacturer	:	Sensenich
Type	:	Metal
Type/Model	:	Fixed Pitch / 72CK56-0-52(with STC mods)
Propeller SN#	:	K6560
Date last Installed	:	July 21, 2017
Propeller total time	:	1,143+54 Hours as per aircraft logbook

1.7 Meteorological Information

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

1.8 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.

1.9 Communications

The aircraft was equipped with standard aircraft radio, communications were carried out between the pilot and other aircraft within the area.

1.10 Aerodrome Information

Plaridel Community Airport (RPUX) is located at Plaridel Bulacan Province It is operated by the Civil Aviation Authority of the Philippines. The aerodrome is about one (1) Km NW from the city proper. It has standard day markers and a hangar facility which has radio transceiver, Rescue and firefighting equipment. The aerodrome is suitably for day operations only and is listed as Community Aerodrome Facility under the Air Traffic Management Service Aerodrome Information Publication (AIP).

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1.10.1 General Information

Aerodrome name	:	Plaridel Community Airport (RPUX)
Coordinates	:	145329.5445N 1205111.1410E. WGS-84
Aerodrome Operator address, telephone, telefax, telex, AFS	:	Civil Aviation Authority of the Philippines Plaridel Airport, Plaridel 3004 Bulacan Province Phone: (044) 795-0637 / (02) 879-9122 to 9125
Elevation	:	6.20M AMSL.
Runway Direction	:	17/35
Runway Length	:	900 Meters
Runway Width	:	30 Meters
Types of traffic permitted	:	VFR
Surface	:	PCN 8 F/C/Y/U ASPH ; Stopway: Asphalt
ATS Reporting Office (ARO)	:	2300 - 0900
Frequency/Operation	:	122.4MHZ, 5447.5KHZ, 3834KHZ / 2300 - 0900
Fueling	:	NIL
AD category for fire fighting	:	CAT IV.
Rescue equipment	:	One (1) fire truck - SIDES VMA28 and land rover.
Apron surface and strength	:	Surface: PCCP. Strength: Nil.
Taxiway width, surface and strength	:	Width: 9M. Surface: ASPH. Strength: Nil.
Aerodrome Obstacles	:	17/35, Trees and houses, Water tank Meralco post Balching plant. Exercise caution during landing and takeoff.

1.11 Flight Recorders

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

1.12 Wreckage and Impact Information

The flight instructor executed a forced landing on a secluded residential lot in Plaridel Heights Subdivision, Malolos Road, Bagong Bayan, Plaridel, Bulacan. It is about 560 meters away from the threshold of runway 17. The right wing of the aircraft collided a tree branch that reduced the momentum of ground impact. The aircraft sustained substantial damage on both wings and fuselage. The aircraft settled heading North with coordinates of 14°52'57.19"N, 120°51'12.73"E.

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Figure 2 - The aircraft showing its propeller and impact damage on its left wing.

Figure 3 - RP-C4623 impact damage on the right wing and fuselage.

1.13 Medical and Pathological Information

Both pilot's medical certificates are current and met the CAAP and ICAO Annex 1 medical standards to exercise the privileges of their license. There was no medical impediment on the pilots that could have had a bearing on this occurrence.

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1.14 Fire

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

1.15 Search and Survival Aspects

The accident was survivable due to the structural integrity of the flight compartment, which was not hampered, thereby providing safety for the occupants at the time of the accident. The occupants of the aircraft were secured by a seatbelt and a harness, which remained intact after the impact. No search operation was deployed since the occurrence was within the vicinity of the aerodrome. The airport air traffic controller immediately dispatched Crash Fire Rescue (CFR) units to help secure the aircraft and its occupants.

1.16 Test and Research

An inspection of the aircraft structures and its engine was conducted by the operator together with their mechanics and was witnessed by AAIIB investigator at Plaridel, Bulacan on September 24-25, 2021.

1.17 Organizational and Management Information

1.17.1 The Operator

Precision Flight Controls Philippines Inc. has an Aircraft Training Organization Certificate (ATOC) #2019-01 authorized to perform Flight ang Ground training operations that provides private pilot course, commercial pilot course, flight instructor course and refresher for single engine land services. Precision Flight Controls Philippines Inc. flight operations is located at Plaridel Community Airport, Plaridel, Bulacan. The aircraft RP-C4623, is listed on their ATOC Operations specification.

1.17.2 Maintenance

The maintenance function of RP-C4623 is being undertaken by Precision Flight Controls Philippines Inc. Approved Maintenance Organization (AMO) with facility located at Integrated Aviation Hangar, Plaridel Community Airport, Plaridel, Bulacan.

2.0 ANALYSIS

2.1 General

The flight instructor was properly certificated and qualified under PCAR and operator procedures as authorized to conduct flight training. The student pilot has no evidence of any pre-existing medical or physical conditions that might have adversely affected his performance during the flight.

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At about 0645H, the flight instructor and the student pilot filed a flight plan with Plaridel Tower via email, after which they briefed for the flight, which was about “ground track maneuvers” and “emergency procedures." This is in preparation for the SP to the CAAP check ride for a private pilot license.

The company mechanic stated that the aircraft was fueled at the Integrated hangar, which is about six hundred sixty (660) meters from the Plaridel community airport ramp area. At about 0710H, he performed the usual three hundred sixty (360) degree inspections and did the typical engine checks, including magneto and static runs. At about 0715H, the aircraft was taxied to the airport holding point 17 to proceed with its flight training utilization.

2.2 Aircraft Fuel Servicing

The mechanic on duty started fueling the aircraft about 0700H, but he was not aware of the serviceability of the fuel filter funnel used to service the aircraft. The operator acquires fuel through storage drums from a fuel depot outside the airport facility and stores it outside the hangar (Figure 4). The operator uses the traditional way of fueling, which is done by gravity through a chamois and a fuel filter funnel. From the fuel drum, it is transferred to a small container, where it is used to service the aircraft. The use of a fuel filter funnel will not ensure that water will be filtered. Upon review of the company operations manual and standard operating procedures, there was no established procedure for dispensing aviation fuel to service the aircraft.

Figure 4 - The operator utilized fuel drums for aircraft fueling and storage.

Rolling the drum from the storage area to the ramp is the method of transfer. From the drum, it is immediately transferred to a small container utilizing a fuel filter funnel to service the aircraft without allowing suspected fuel sediments to settle (Figure 5). It was observed that there was a significant amount of fuel and water mixture in the fuel sample taken from the engine fuel lines.

Since fuel is kept and purchased in drums, the buildup of water in stored fuel drums can be extremely difficult to spot unless it is properly tested. Water can enter the fuel in a number of

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different ways. Fuel is a hygroscopic fluid, meaning that it is able to absorb moisture from the air around it. It was observed that no record of maintenance on the fuel drums was found. Proper maintenance ensures that the fuel drum remains structurally sound, reducing the risk of leaks, spills, or other hazardous incidents. Regular inspections can identify potential issues such as corrosion, rust, or damage that could compromise the integrity of the drum. Fuel quality can be compromised if the drum is not properly maintained. Contamination can occur due to rust, corrosion, or other issues, leading to engine problems and increased maintenance requirements for vehicles and equipment.

Another type of water contaminant is free water. Free water develops as a layer beneath stored fuel after phase separation occurs. With the presence of free water in a fuel storage drum comes the possible proliferation of microbial growth within the fuel. When the presence of free water is ignored, microbial growth will live and grow in the layer where the water meets the fuel. Hydrocarbons in fuel provide food and energy for the “fuel bug” (that is often referred to as “algae”) to rapidly spread. Once microbial growth exists in a fuel tank, sludge develops as a waste byproduct of the hydrocarbons being consumed by the microbes.

Figure 5 - Sample fueling using the company’s fuel filter funnel.

In the light of this case, the variable efficacy of the fuel in the tanks would have led to water periodically entering the tank, although it is likely that this could have been removed by the daily water drain checks. Further interview with the maintenance personnel stated that they performed the routine fuel drain check before flight. However, the aircraft log book on the day of the accident did not show that the water drain check was performed. This raises the possibility of the check being omitted.

2.3 Aircraft Fuel System

Tests were conducted on the engine's mechanical fuel pump. But due to the aircraft engine submerged on the residential lot in stagnant water, The amount of contamination greatly affected the aircraft fuel system. Only sealed components of the fuel system were examined and analyzed regarding the fuel flow of the engine.

Inspection of the spark plugs was also done. The examination of the spark plugs shows that five (5) of the eight (8) spark plugs removed from the engine have traces of fuel water

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contamination (Figure 6). This confirmed that the engine had stopped due to the presence of a significant quantity of water that entered the system, hampering the spark plugs normal operation.

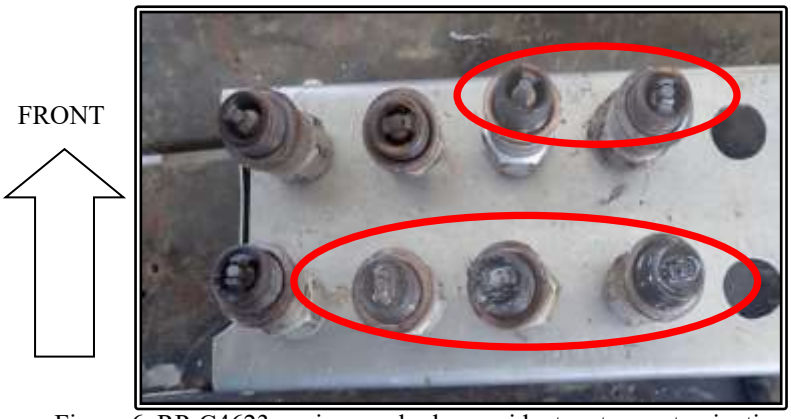

Figure 6. RP-C4623 engine spark plugs evident water contamination.

3.0 CONCLUSION

3.1 Findings

a. Both the FI and SP were qualified on the Textron Aviation Inc. Cessna C152 type of aircraft.
b. Both the FI and SP have valid licenses and medical certificates issued by the CAAP.
c. Both the Pilots safely egress the aircraft safely.
d. Visual meteorological condition prevailed at the time of the occurrence.
e. The aircraft was properly released for flight without any discrepancies noted on its logbook.
f. The aircraft has a current Certificates of Airworthiness.
g. The aircraft has a current Certificates of Registration.

3.2 Probable Cause

3.2.1 Primary Cause Factor

a. The presence of water in the engine fuel system that resulted in engine failure.

3.2.2 Contributory Cause Factors

b. Lack of fueling procedures that lead to serious safety hazards.

4.0 SAFETY RECOMMENDATIONS

4.1 CAAP-FSIS to ensure that:

a. The Company Operations manual includes comprehensive procedures on the dispensing of aviation fuels and the maintenance of fuel drums.

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b. The Company include in their refresher training for pilots and maintenance personnel the standards practices, and safety measures to be observed when fueling an aircraft.

-END-

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