
**DIRECTORATE GENERAL OF CIVIL AVIATION**

# INVESTIGATION REPORT ON FORCED LANDING INCIDENT TO M/s PIONEER FLYING ACADEMY PVT. LTD. CESSNA 152 AIRCRAFT VT-NNN ATYAMUNA EXPRESS HIGHWAY ON 27.05.2021

**GOVERNMENT OF INDIA, O/o DIRECTOR GENERAL OF CIVILAVIATION, OPP. SAFDARJUNG AIRPORT, NEW DELHI-110003**

**INVESTIGATION REPORT ON FORCED LANDING INCIDENT TO M/s PIONEER FLYING ACADEMY PVT. LTD. CESSNA 152 AIRCRAFT VT-NNN AT YAMUNA EXPRESSHIGHWAY ON 27.05.2021**

| | | | |
|---|---|---|---|
| 1 | Aircraft | Type | Cessna 152 |
| | | Nationality | Indian |
| | | Registration | VT-NNN |
| 2 | Owner | | M/s Pioneer Flying Academy Pvt. Ltd. |
| | Operator | | |
| 3 | Pilot – in –Command | | SPL Holder under supervision of Instructor |
| | Extent of injuries | | Nil |
| 4 | Date & Time of Incident | | 27.05.2021 & 1230 hrs IST Approx |
| 5 | Place of Incident | | Yamuna Expressway, 22KM from Mathura Toll Plaza |
| 6 | Co-ordinates of Incident site | | Latitude 27° 50' 59.5" N<br>Longitude 77° 43' 01.8" E |
| 7 | Last point of Departure | | Aligarh Airport |
| 8 | Intended place of landing | | Aligarh Airport |
| 9 | No. of Passengers on board | | Nil. |
| 10 | Type of Operation | | Flying Training |
| 11 | Phase of Operation | | Cruise |
| 12 | Type of Incident | | Forced landing due engine malfunction |

(All timings in the report are in IST or else specifically mentioned)

**SYNOPSIS**:

On 27.05.2021, M/s Pioneer Flying Academy Pvt. Ltd. Cessna152 aircraft VT-NNN was scheduled to operate a dual cross country flight. The flight was planned for sector Aligarh - Overflying Alwar- Overflying Narnaul- Aligarh. This was the second flight of the day for student pilot and first flight of the day for instructor. For theaircraft this was second sortie of the day. Another student pilot and instructor carried out local flying exercise on VT-NNN and landed at about 1030hrs IST. Pre-Flight inspection was carried out by the student pilot.

Aircraft took-off from Aligarh Airstrip at about 1205hrs IST for dual cross country flight. Aircraft was under the control of student pilot with instructor onboard the aircraft.Takeoff and climb was uneventful with visibility reported about 6000ft. While cruising at 5000ft and approximately 23NM outbound of Aligarh airstrip, crew noticed drop in engine RPM. Instructor took over the control and tried to recycle the engine controls,however there was no response from the engine. Due to less engine power, the aircraft descent rate started increasing. Instructor again recycled the controls couple of times but there was no gain in engine power. The crew onboard the aircraftdecided to land the aircraft on suitable open field. Crew selected Yamuna Expresswayto make the force landing. The force landing was carried out on Yamuna Expresswayat around 1230hrs IST. Crew secured the aircraft and moved the aircraft to side of the expressway and informed to CFI.

Director General of Civil Aviation instituted the investigation by appointing Investigator-in-Charge vide order no. DGCA-15018(19)/5/2021-DAS dated 03.06.2021 under Rule 13(1) of The Aircraft (Investigation of Accidents and Incidents) Rules 2017. During investigation it was found that;

The probable cause of the incident is slipping out of mixture control cable from carburetor linkage due to insufficient pressure caused by missing washer which further resulted in the loss of engine power during flight.

Perfunctory maintenance action was the contributory factor to incident.

## 1. FACTUAL INFORMATION:

### 1.1 History of Flight:

M/s Pioneer Flying Academy Pvt. Ltd. Cessna152 aircraft VT-NNN was scheduled to operate a dual IR cross country flight on 27.05.2021. The planned flight was authorized by Deputy CFI of the FTO. The flight was planned for the sector Aligarh - Overflying Alwar- Overflying Narnaul- Aligarh. This was the second flight of the day for student pilot and first flight of the day for instructor. For the aircraft this was second sortie of the day. Another student pilot and instructor carried out local flying exercise on VT- NNN and landed at about 1030hrs IST.

The student pilot and instructor authorized for dual cross country reported the FTO for planned flight. Pre-Flight inspection was carried out by the student pilot.

Aircraft took-off from Aligarh Airstrip at about 1205hrs IST for dual cross country flight. Aircraft was under the control of student pilot with instructor onboard the aircraft.

Takeoff and climb was uneventful with visibility reported about 6000ft. While cruising at 5000ft and approximately 23NM outbound of Aligarh airstrip, crew noticed drop in engine RPM. The mixture control position was at full rich till this time of flight. Instructortook over the control and opened full throttle, however there was no increase in enginepower but aircraft started descending at a rate of 700fpm approximately. Instructor again tried to recycle the engine controls couple of times, however there was no increase in engine RPM. The crew onboard the aircraft decided to land the aircraft onsuitable open field. Crew selected Yamuna Expressway to make the force landing. The force landing was carried out on Yamuna Expressway at around 1230hrs IST at about 22KM from Mathura Toll Plaza. Crew secured the aircraft moved it to the side of expressway and informed to CFI. There was no injury to both the crew onboard the aircraft and both the crew came out unhurt. There was no evidence of fire at any stage.

**1.2 Injuries to Persons** :

| **Injuries** | **Crew** | **Passengers** | **Others** |
|---|---|---|---|
| Fatal | NIL | NIL | NIL |
| Serious | NIL | NIL | NIL |
| Minor/None | 2 | NIL | |

**1.3 Damage to Aircraft**: Nil damage was received by aircraft post forced landing.

**1.4 Other Damages:** Nil

**1.5 Personnel Information:**

**1.5.1 Student Pilot:**

| | |
|---|---|
| Age | 26 Years, Male |
| License | Student Pilot License |
| Date of Issue | 26.10.2020 |
| Valid upto | 25.10.2025 |
| Category | Aeroplane |
| Endorsement | Cessna 152 |
| Date of Class I med exam | 14.10.2020 |

| | |
|---|---|
| Class I Medical Validity | 31.10.2021 |
| Total Flying Experience | 92:35 |
| Experience on Type | 92:35 |
| Experience as PIC on Type | 52:45 |
| Total Flying Experience in the Last 30 Days | 36:00 |

### 1.5.2 Instructor:

| | |
|---|---|
| Age | 22, Male |
| License | CPL |
| Date of Issue | 25.02.2019 |
| Validity of CPL | 24.02.2024 |
| Endorsement | Cessna 152, Cessna 172 |
| FIR Date of Issue | 09.02.2021 |
| FIR Valid Till | 08.02.2022 |
| Date of Last Class 1 Medical | 30.07.2020 |
| Validity of Medical | 29.07.2021 |
| FRTOL Issue Date | 25.02.2019 |
| FRTOL Valid Till | 24.02.2024 |

### 1.5.3 AMEs:

| **AME 1** | |
|---|---|
| Category | B1 |
| Type of Aircraft | Cessna 152, Cessna 172S |
| Type of engine | Lycoming IO-360, Lycoming O-235 |
| Limitation/ Additional Privileges | Full Scope including installation and Swing Check of DR Compass |
| **AME 2** | |
| Category | B1 |
| Type of Aircraft | Cessna 152, Cessna 172S |

| | |
|---|---|
| Type of engine | Lycoming IO-360, Lycoming O-235 |
| Limitation/ Additional Privileges | Full Scope |

**1.6 Aircraft Information**:

Cessna 152 aircraft is an all-metal, two-place, high-wing, single-engine airplaneequipped with tricycle landing gear and designed for general utility purposes. The construction of the fuselage is a conventional formed sheet metal bulkhead, stringer, and skin design referred to as semi monocoque.

The aircraft VT-NNN is manufactured by Cessna Aircraft Company Wichita, Cansas, USA. Aircraft is bearing Manufacturer's Serial No. (MSN) 152-85954. Aircraft was manufactured during the year 1985. Aircraft is installed with Lycoming Piston type Engine with Model No. O-235-N2C. Aircraft is fitted with one 2 blade propeller on its nose position and the propeller type is McCauley/ Sensenich with Model No. 1A103/TSM6958 or 72CKS6-0-54. The aircraft maximum takeoff mass is 759Kgs.

The aircraft is being utilized by M/s Pioneer Flying Academy Pvt. Ltd. for Flying Training activities. Till the incident flight aircraft recorded a total of 12689:50 hrs TSN. Aircraft Engine and propeller completed 1662:45 hrs TSO.

1.6.1 On 26.04.2021, Fuel Mixture Control cable was replaced as per the approved maintenance procedure i.e more than a month back to the incident.

Following scheduled maintenance actions were carried out on aircraft day before the incident flight i.e on 26.05.2021 and 27.05.2021:

1. **Operation II/ 100 hrs inspection:** The operation 02/ 100 hrs inspection covers following area:
   a. Engine
   b. Fuel System
   c. Propeller
   d. Landing gears
   e. Airframe
   f. Battery
   g. Control System
   h. Special Inspections.

2. **Operation I/ 50 hrs inspection:** The operation 01/ 50 hrs hours inspection covers following area:
   a. Engine
   b. Fuselage
   c. Cabin
   d. Propellers
   e. Wings
   f. Landing Gear
   g. Empennage

h. Special Inspection

Following area covered in engine specifically in “Engine control and linkage”as per the Operation-I and Operation-II inspection:

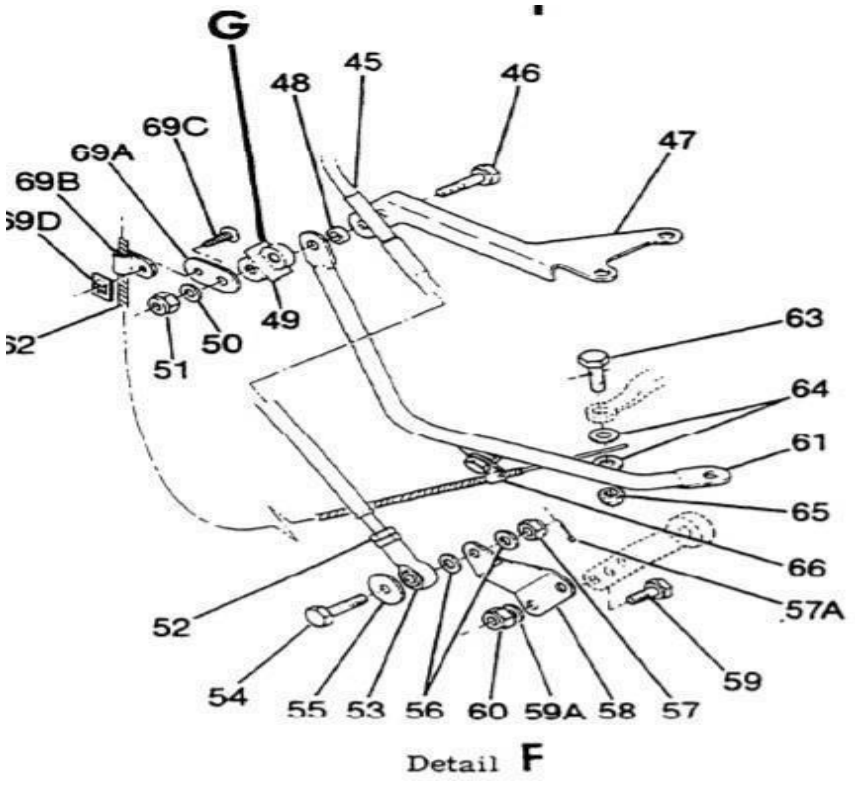
- Check general condition and freedom of movement, security and properoperations.
- Clean and lubricate all controls.
- Replace controls if due.

After both the above inspection on 26.05.2021 and 27.05.2021, aircraft was released on the morning of 27.05.2021 for flying training activities.

Aircraft VT-NNN did one sortie of circuit and landing for 30 minutes after maintenance action and then aircraft was released for another flight which met with incident of inflight malfunction of engine.

### 1.6.2 Installation procedure of Fuel Mixture control cable to carburetor linkage:

The installation procedure of Fuel Mixture control cable to carburetor end is shown in the figure and part No. 63,64 and 65 wherein a half threaded bolt passes through carburetor linkage. The Mixture Control Cable passes through a hole on half threaded bolt with a washer on the upper side and another washer on lower side and finally tightened with a bolt.



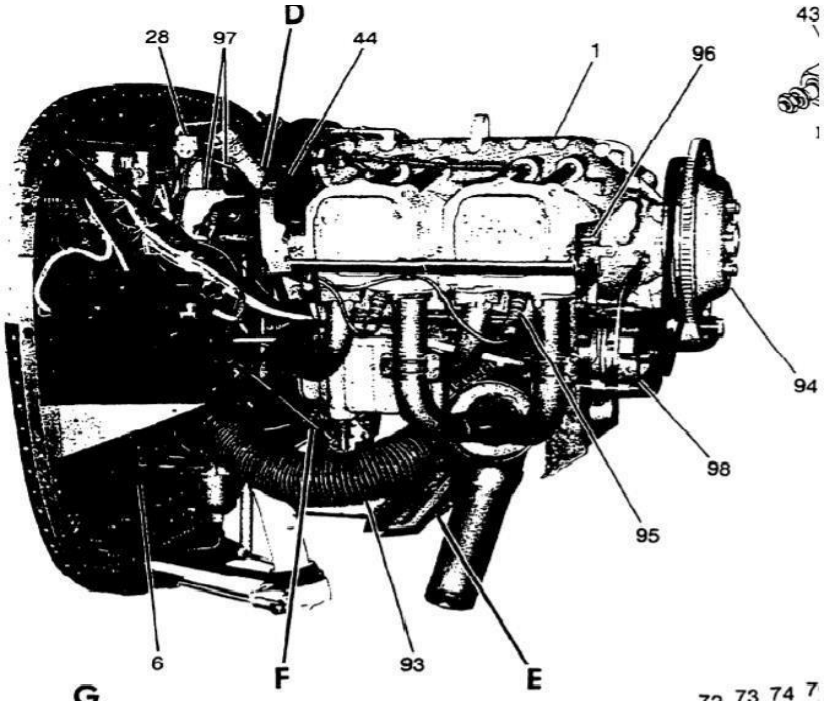



*Fig-1: Part-F showing fitting of Fuel Mixture control cable oncarburetor linkage at part No. 63, 64 & 65.*

| | | | |
|---|---|---|---|
| | | ---*--- | |
| -61 | 0456008-5 | SUPPORT ASSY-MIXTURE CONTROL | 1 |
| -62 | 9862010-3 | CONTROL-MIXTURE | 1 |
| | | ATTACHING PARTS | |
| -63 | S2323-13 | CLAMP | 1 |
| -64 | AN960-416 | WASHER | 2 |
| -65 | MS21042L4 | NUT | 1 |
| -66 | AN742D3 | CLAMP | 1 |
| | AN3-4A | BOLT | 1 |

*Fig-2: Showing 02 quantity of washers are required to hold Fuel Mixture control cable with carburetor linkage (part 64 shows 02 quantities)*

### 1.7 Meteorological Information:

The Weather observed on that day was Clear Skies with more than 6000 meters visibility.

### 1.8 Aids to Navigation:

Aligarh VOR is located 2.3 NM to the South East of the airfield.

### 1.9 Communication:

Aircraft was in contact with Ground R/T operator on VHF Frequency.

### 1.10 Aerodrome Information:

Aligarh aerodrome is uncontrolled airfield. The airstrip is located 2.3m North West of Aligarh VOR. It is 110°, 4.6 nm from Aligarh railway station. The aerodrome is used for flying by two Flying Training Organisation. The runway orientation is 29/11.

### 1.11 Flight Recorders :

Aircraft is not fitted with any flight recorder.

### 1.12 Wreckage & Impact Information:

The aircraft made a forced landing at Yamuna Express way. However there was no damage to aircraft and any other property.

**1.12.1 Post incident aircraft inspection:** After the incident engine was inspected for any sign of fuel or oil leakage, however no sign of fuel/ oil leak observed. After opening of the engine cowls, the control Cable connecting the mixture control knob to the carburetor was found disconnected from the carburetor end. The cockpit control positions were as follows:

- Carburetor heat: OFF
- Throttle: IDLE,
- Mixture: RICH.
- Fuel shut off valve was ON.
- The fuel remaining in LH tank was 45 liters and fuel remaining in RH tank was 40 liters.
- The engine oil level was measured to be 05Qts.

The position of the controls is depicted in the figure below:


1.12.2 During further inspection it was observed that the control cable which connects the Fuel

mixture control knob at cabin to carburetor linkage of engine came out of the carburetor linkage.

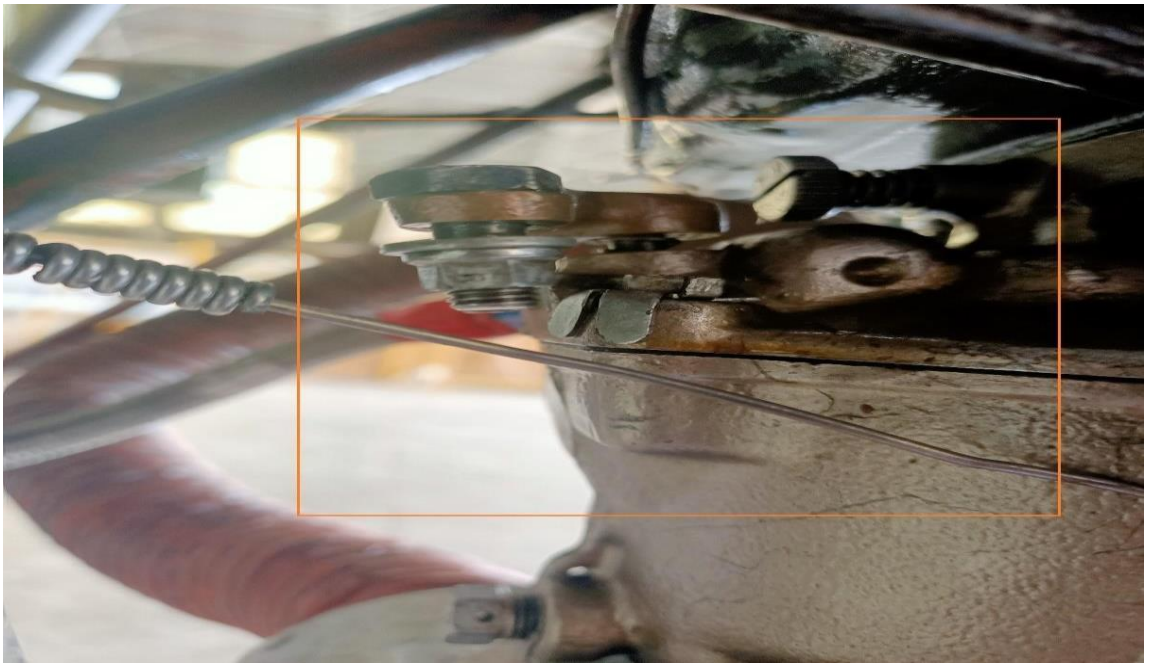


*Fig-3: Indicating the fuel mixture control cable came out of carburetor linkage and carburetor linkage is containing only one washer*

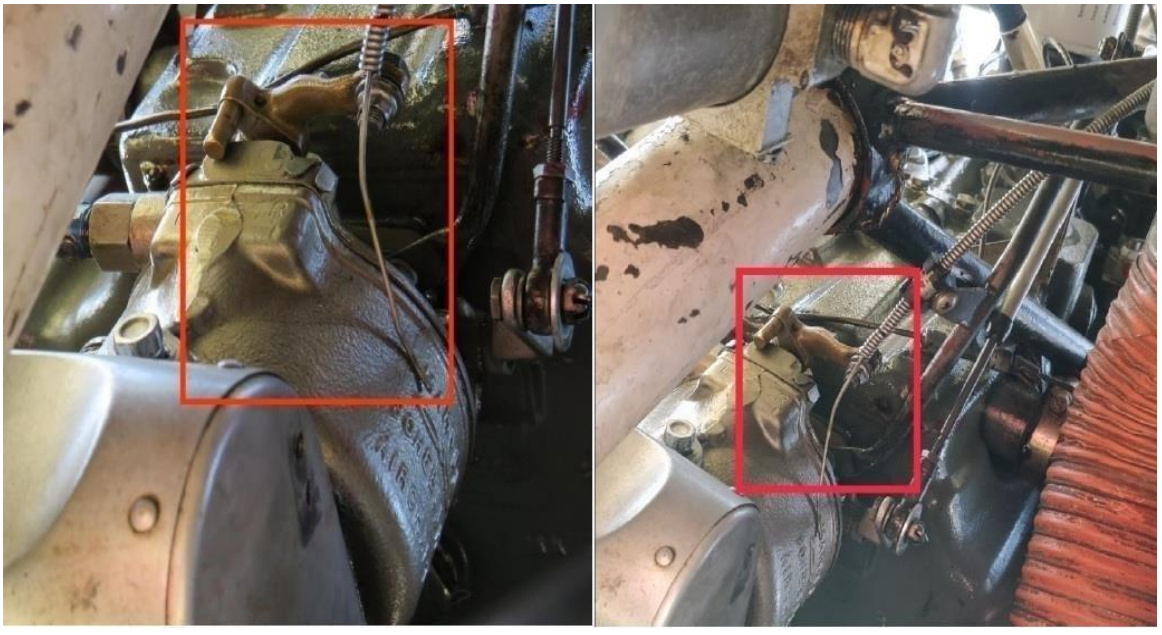


*Fig-4: Indicating the fuel mixture control cable came out of carburetor linkage*

Fig-3 and Fig-4 taken from the aircraft involved in incident indicates that there was only one washer present to hold the fuel mixture control cable at carburetor linkage.

### 1.13 Medical & Pathological Information:

Both the instructor and student pilot submitted the self-undertaking as per the prevailing guidelines by DGCA for not under the influence of alcohol.

### 1.14 Fire:

There was no pre and post impact fire during the incident.

### 1.15 Survival Aspects:

Incident was survivable.

### 1.16 Test and Research:

Following test and research were carried out:

1. **Test of fuel and oil sample taken from the aircraft:**
   Fuel and oil samples were sent to DGCA lab for examination and passed all the tests.
2. To rule out the possibility of failure of engine and other component of engine resulting in loss of engine power during flight, following test/ inspections were carried out:
   - Bomb test of spark plug was carried out and found satisfactory.
   - Visual condition of spark plugs (08 in quantities bearing part No. REM38E) for carbon deposit, lead deposit and gap check was carried out and found satisfactory.
   - Cylinder compression check carried out and found to be satisfactory for all fourcylinders.
   - Oil contamination check carried out and found satisfactory.
   - Magneto to engine timing check carried out and found satisfactory.
   - Fuel filter contamination check carried out and found satisfactory.

   There was no abnormality observed in engine and fuel system.

3. **Material failure testing of nut, bolt, washer and fuel mixture control cable:**

   The fuel mixture control cable, nut, bolt, washer were sent to DGCA lab for examination to establish the cause of failure. The lab report concluded that the mixture control cable may have slipped from theinstallation due to insufficient grip pressure caused by missing washer.

### 1.17 Organizational & Management Information:

M/s Pioneer Flying Academy is a DGCA approved flying training organization and operates with Cessna 152 and Cessna 172 aircrafts for flying training.

**1.18 Additional Information**:

On 26.05.2021 and 27.05.2021 scheduled inspection Operation II/ 100 hrsand Operation I/ 50 hrs was carried out by the qualified Aircraft Maintenance Engineers. Both the above-mentioned schedules requires inspection of engine. The maintenance engineers agreed to the fact that during the maintenance action prior to the incident day they missed to install the second washer required to hold fuel mixture control cable with carburetor linkage.

**1.19 Useful and Effective Techniques**: Nil

## 2. ANALYSIS:

**Operation Aspect:**

Cessna152 aircraft VT-NNN owned and operated by M/s Pioneer Flying Academy Pvt. Ltd. was planned to operate a dual cross country flight on 27.05.2021. The flight was authorized by Dy. CFI of the FTO. Both the student pilot and instructor submitted the declaration for not being under the influence of alcohol as per the existing DGCA guidelines.

The training flight was planned to fly from Aligarh- Overflying Alwar- Overflying Narnaul-Aligarh. The instructor and the student pilot was appropriately qualified to operate planned flight. This was the second flight of the day for student pilot and first flight of the day for instructor. For the aircraft VT-NNN this was second sortie of the day.

After carrying out pre-flight checks aircraft took off at 1205 hrs IST from Aligarh airstrip for dual cross country flight. Aircraft was under the command of student pilot with instructor onboard the aircraft. The weather was conducive for flying operation with visibility of about 6000ft. Takeoff was uneventful, however during climb when aircraft was at cruising altitude of 5000ft approximately, crew noticed drop in engine RPM. The fuel mixture control position was at full rich till this time of flight. Instructor took over the control and opened full throttle, however there was no increase in engine power but aircraft started descending at a rate of 700fpm approximately. Instructor again tried to recycle the engine controls couple of times, however there was no increase in engine RPM. The crew onboard the aircraft decided to land the aircraft on suitable open field. Crew selected Yamuna Expressway to make the force landing. The force landing was carried out on YamunaExpressway at around 1230hrs IST and approximately 22KM from Mathura Toll Plaza. Crew secured the aircraft and informed to CFI. There was no injury to anyone onboard the aircraft and both the crew came out unhurt. There was no evidences of fire at any stage pre and post forced landing.

From the above it is inferred that crew action / operational aspect was not he factor of incident.

**Engineering Aspect:**

The aircraft was having a valid Certificate of Registration (C of R) at the time of operating incident flight. VT-NNN was holding a valid Certificate of Airworthiness (C of A) and Airworthiness Review Certificate (ARC) at the time of incident flight. There was no snag

reportedby the pilot operated the flight before the incident flight on the same day.

On 26.05.2021 i.e one day before the incident flight the aircraft VT-NNN was scheduled for Operation II/ 100 hrs and Operation I/ 50 hrs inspection.

Following scheduled maintenance actions were carried out on aircraft on 26.05.2021 and 27.05.2021:

1. Operation II/ 100 hrs inspection:
2. Operation I/ 50 hrs inspection

After both the above maintenance actions Aircraft was released on 27.05.2021 for flying operation. These maintenance inspection requires work on engine including checking general condition and security of attachment of throttle and mixture control.

Aircraft VT-NNN carried out one sortie of 03 circuit and landing for 30 minutes after maintenance action and no abnormality was reported by the operating crew. Subsequently the aircraft was released for another flight and met with incident due loss of engine power and made a forced landing on Yamuna Expressway.

After the incident engine was inspected for any sign of fuel or oil leakage, however nosuch sign of fuel/ oil leak observed. The detailed investigation revealed that the control cable connecting mixture control knob to the carburetor linkage had slipped out and disconnected from the carburetor end.

Post incident investigation revealed that only one washer was present in the carburetor linkage to hold the mixture control cable. This implies that maintenance personal did not ensure the proper tightness of mixture control cable with carburetor linkage by using two washers as required by Maintenance Manual. Same was also corroborated with the acceptance of the maintenance lapses by the AMEs involved in maintenance action.

The above deliberation reveal that the perfunctory maintenance action carried out by maintenance personal is the contributory factor to the incident.

## 3. CONCLUSION:

### 3.1 Findings:

**3.1.1** Aircraft VT-NNN was having valid C of A and valid ARC.

**3.1.2** Crew License were valid on the day of incident.

**3.1.3** Aircraft took off for cross country flight with student pilot and instructor onboard from Aligarh Airstrip.

**3.1.4** While cruising at 5000ft and approximately 23NM outbound of Aligarh airstrip, crew noticed drop in engine RPM. The mixture control position was at full rich till this time of flight. Instructor took over the control and opened full throttle, however there was no increase in engine power but aircraft started descending at a rate of 700fpm approximately.

**3.1.5** Crew decided to land and selected Yamuna Express Highway for making a safe landing. Crew carried out forced landing. There was no injury and crew escaped unhurt.

**3.1.6** The investigation revealed that the control cable connecting the mixture

control knob to the carburetor linkage had slipped out and disconnected from the carburetor end.

**3.1.7** During the detailed scrutiny it was observed that there was only one washer available at carburetor linkage to hold the fuel mixture control cable instead of requirement of 02 washers as per the Maintenance Manual.

**3.1.8** During the scrutiny of maintenance records, it was observed that scheduled maintenance inspection was carried out on the aircraft from 26.05.2021 to 27.05.2021.

**3.1.9** The maintenance personnel carrying out maintenance inspection missed the installation of second washer required to hold the mixture control cable with carburetor linkage.

### 3.2 Probable Cause of Incident:

The probable cause of the incident is slipping out of mixture control cable from carburetor linkage due to insufficient pressure caused by missing washer which further resulted in the loss of engine power during flight.

Perfunctory maintenance action was the contributory factor to incident.

## 4. SAFETY RECOMMENDATIONS:

Action as deemed fit may be taken by DGCA based on findings and cause.

(Shashi Paul)
Assistant Director Air Safety & IIC, VT-NNN
Dated 22.08.2022