



सत्यमेव जयते

GOVERNMENT OF INDIA

CIVIL AVIATION DEPARTMENT

INVESTIGATION REPORT

**INCIDENT TO M/S RAJIV GANDHI ACADEMY FOR AVIATION TECHNOLOGY,
CESSNA 172R AIRCRAFT VT-RGV AT TRIVANDRUM AIRPORT ON 03-04-2017**



O/o Director Air Safety (SR), Chennai – 600 027

FOREWARD

This document has been prepared based upon the evidences collected during the investigation, opinion obtained from the experts and laboratory examination of various components. The investigation has been carried out in accordance with Annex 13 to the convention on International Civil Aviation and under Rule 13(1) of the Aircraft (Investigation of Accidents and Incidents), Rules 2012.

The investigation is conducted not to apportion blame or to assess individual or collective responsibility. The sole objective is to draw lessons from this incident which may help to prevent such future incidents.

INDEX		Page No
General Information		3
Synopsis		3
1.0 Factual Information		4
1.1	History of Flight	4
1.2	Injuries to Persons	4
1.3	Damage to aircraft	5
1.4	Other Damage	5
1.5	Personnel Information	5
1.6	Aircraft Information	5
1.7	Meteorological Information	7
1.8	Aids to Navigation	8
1.9	Communication	8
1.10	Aerodrome Information	8
1.11	Flight recorders	8
1.12	Wreckage and Impact Information	8
1.13	Medical and Pathological Information	9
1.14	Fire	9
1.15	Survival aspects	9
1.16	Organizational and Management Information	9
1.17	Additional information	9
1.18	Useful and effective investigation techniques	9
2.0 Analysis		9
2.1	Aircraft Handling by the Flight Cadet	9
2.2	Maintenance of Aircraft	10
2.3	Weather	11
3.0 Conclusion		11
3.1	Findings	11
3.2	Causes	12
4.0 Safety Recommendations		12

**FINAL INVESTIGATION REPORT ON INCIDENT TO M/S RAJIV GANDHI
ACADEMY FOR AVIATION TECHNOLOGY, CESSNA 172R AIRCRAFT VT-RGV
AT TRIVANDRUM AIRPORT ON 03-04-2017**

1	Aircraft	Type	Cessna 172R
		Nationality	India
		Registration	VT-RGV
2	Owner and Operator		M/s Rajiv Gandhi Academy for Aviation Technology (RGAAT), Trivandrum
3	Pilot – in - Command		Student Pilot
	Extent of injuries		Nil
4	Date & Time of Incident		Date: 03-April-2017 Time: 08:08 hrs UTC
5	Place of Incident		Trivandrum Airport
6	Co-ordinates of Incident site		Latitude :08°28'47"N Longitude :76 °55'11"E
7	Last point of Departure		VOTV (Trivandrum International Airport)
8	Intended place of landing		VOTV
9	No. of Passengers on board		Nil
10	Type of Operation		Flying Training
11	Phase of Operation		Landing
12	Type of incident		Runway Excursion

(All timings in the report are in UTC unless or otherwise specified)

SYNOPSIS:-

On 3rd April 2017, Cessna 172R aircraft VT-RGV of M/s Rajiv Gandhi Academy for Aviation Technology, Trivandrum under the command of a Flight Cadet (Trainee) was carrying out Local flying (solo sortie). This was the second sortie of the day for the flight cadet, first sortie was uneventful. The aircraft took off at 07:35 hrs from Trivandrum Airport and carried out three touch and go exercises. During the last full stop landing the aircraft touched down, steered left and went out of the runway and came to a halt at 110m away from runway centreline thus leading to a 'Runway excursion incident'.

The incident took place at 08:08 hrs. Weather was fine with wind of 260°/11 kt.

In view of the incident, the Director General of Civil Aviation instituted an investigation into the facts and circumstances of the incident to ascertain the cause of the incident by appointing an Inquiry Officer vide Order No: AV.15022/6/2017-AS dated 16-05-2017 under Rule 13(1) of Aircraft (Investigation and accidents and incidents) Rules 2012.

Investigation has concluded that the cause of the incident was due to improper handling of flight controls by the Flight Cadet during landing.

1. FACTUAL INFORMATION

1.1. History of the flight

- 1.1.1. On 3rd April 2017, 2 sorties were planned for the Flight Cadet on Cessna 172R aircraft VT-RGV. The Aircraft Maintenance Engineer carried out Daily Inspection of aircraft as per approved schedule in the morning. There was no snag reported on the aircraft. The Flight Cadet was authorized for two 'Circuit and Landing' (C/L) sorties.
- 1.1.2. First C/L sortie was carried out with the CFI for 00:25 hrs with 03 landings. On satisfactory performance, the CFI released the flight cadet for solo C/L sortie.
- 1.1.3. The aircraft departed for C/L solo at 07:35 hrs. Weather was reported fine and the visibility prevailing was 6000m. Take off clearance was obtained from Trivandrum ATC.
- 1.1.4. Three touch and go exercises were carried out on Runway 32 and were uneventful. During last full stop landing, the aircraft after touched down on Runway 32 veered left and went out of the runway due to excessive application of rudder. The flight cadet being aware of the situation immediately pulled out the mixture, applied brakes and the aircraft came to a halt. The flight cadet informed this to ATC and requested for assistance. The Flight cadet followed switch off procedures and came out of the aircraft unhurt.
- 1.1.5. The aircraft came to a halt at 110m left of the runway centerline.
- 1.1.6. The Flight Cadet had a total flying experience of 42:15 hrs, of which 03:25 hrs solo.
- 1.1.7. The incident occurred during day time at 08:08 hrs at Trivandrum International Airport, Trivandrum. Latitude: 08° 28' 47" N, Longitude: 07° 55' 11" E. Elevation of the airfield is 15ft.

1.2. Injuries to persons

Injuries	Crew	Passengers	Others
Fatal	Nil	Nil	Nil
Serious	Nil	Nil	Nil
None	1	Nil	Nil

1.3. Damage to aircraft

There was no damage to the aircraft.

1.4. Other damage

Nil

1.5. Personnel information

1.5.1. Pilot-in-command

Age	:	23
License	:	Student Pilot License
Date of issue	:	10/02/2014
Valid up to	:	09/02/2019
Category	:	Airplane
Date of medical Exam	:	04/08/2015 (Class- II)
Medical Exam valid up to	:	03/08/2017
Date of issue of FRTTO license	:	22/04/2015 (No.7461)
FRTTO license valid up to	:	21/04/2025
Total flying experience during last 1 year	:	09 hrs 30 min
Total flying experience during last 6 month	:	09 hrs 30 min
Total flying experience during last 30 days	:	09 hrs 30 min
Total flying experience during last 07 days	:	03 hrs 10 min
Total flying experience during last 24 hours	:	00 hrs 25 min
Duty time last 24 hours	:	03 hrs 20 min

- a. The flight cadet started his flying training on 07-09-2015.
- b. He was released for first solo by the CFI on 24-08-2015 after 20:05 hrs of dual flying.
- c. There was a break in his flying training from 22-12-2015 to 24-03-2017 due to non-availability of CFI in the organization.

1.5.2. Other crew

N/A

1.5.3. Pertaining information regarding other personnel

Nil

1.6. Aircraft information:

1.6.1. Airworthiness and Aircraft Maintenance Details:

Aircraft S.No.	:	17281346
Year of Manufacturing	:	25-09-2006

Engine Type : Lycoming IO-360-L2A
 Engine Serial No : L-32998-51E
 Certificate of Registration : Valid; No: 3503 issued on 21-02-2007
 Certificate of Airworthiness : Valid; No: 2912 issued on 26-03-2007
 Category & Sub division : NORMAL & PASSENGER
 Max. AUW : 1111.0 Kg
 ARC Expires on : 29-12-2017
 Aircraft Hours since New : 1914:30
 Total time since C of A : 1914:30
 Engine Hours since new : 1914:30
 Propeller Installed : 22-09-2012
 Propeller Hours since new : 667:40
 The following Last Major scheduled inspections were carried out as a part of maintenance work:

Inspections details	On	at A/F Hrs.
Phase III / 600 Hours / Annual Inspection	07-02-2017	1892:50
Phase II / 100 Hours / 6 Months Inspection	22-12-2016	1892:50
Phase III / 600 Hours / Annual Inspection	09-02-2016	1875:35

Inspection of rudder control system:

Rudder control system is checked on Phase I (50hrs), Phase II (100hrs) and Phase III (600hrs) inspections. Whereas rudder travel check is carried out only in Phase III inspection.

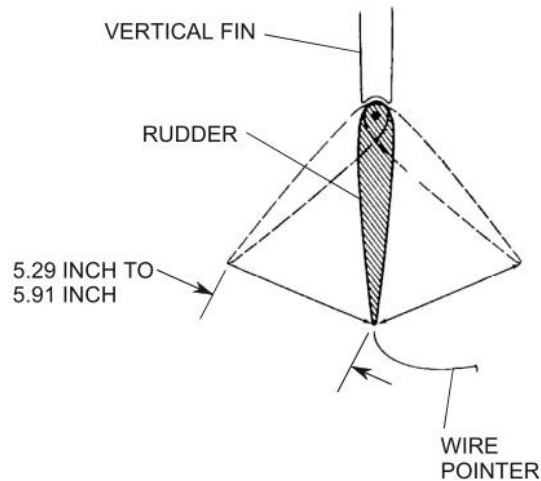
Rudder Travel Check.

Rudder travel check is supposed to be carried out in Phase III inspection by using a digital inclinometer. Alternate method is also specified in AMM. The distance of rudder travel in each direction should be within 5.29 inch to 5.91 inch.

After the incident, the control surface deflection was carried out by alternate method and following discrepancy was observed:

Rudder travel:

Side	Limits as per AMM	Observed reading
LH	5.29" – 5.9"	6.2"
RH		5.2"



(Fig 1: Rudder travel check as per AMM)

Aircraft has flown 35:55 hrs since last 600 Hrs. inspection and no inspection was found due at the time of incident.

There was no snag reported by the operating crew regarding rudder travel after last inspection.

1.6.2. Performance of aircraft

There was no snag reported for the aircraft. The performance of the aircraft was as per design standards nevertheless for the rudder travel. The aircraft was loaded within the C.G. limits.

1.6.3. Type of fuel

AVGAS 100LL is the fuel used for this aircraft.

1.7. Meteorological Information

Meteorological information is provided by Indian Meteorological Department for Trivandrum Airport (ICAO: VOTV).

Time of Incident : 0810 hrs. UTC

MET report at 0800 hrs. UTC:

Visibility : 6000 Mts.
 Wind : 270°/ 10 Knots.
 Temperature : 32° C
 No change in weather trend.

Weather report at the time of issuing landing clearance:

Wind : 260°/ 11 Knots.

The cross wind component during landing was 10 knots. As per Organization's Training Program Manual, the limitation for cross wind component for Student Solo flight is 8-10 knots.

The weather conditions were conducive for flying under Visual Flight Rules. Weather information was available to the student cadet before commencing his sortie and real-time weather available to aircraft by ATIS.

Actual weather condition was fair with calm winds, similar as forecasted above.

1.8. Aids to Navigation

Trivandrum Airport is equipped with DVOR, DME and CAT I landing aid for Runway 32 and was serviceable at the time of incident. All ground visual aids were available as per requirements.

Aircraft is equipped with VOR. However, in this case the aircraft was flying under visual flying rules in the vicinity of Airport and navigation aids were not used.

1.9. Communications

At the time of incident, aircraft was having two way communications with the Air traffic control of Trivandrum Airport

1.10. Aerodrome Information

Trivandrum International Airport is operated by M/s Airports Authority of India (AAI) and is located at the height of 15 ft. above MSL. The airport has single runway 32/16 which is 3398m long and 45m wide which is adequate for the type of aircraft used for flying training by the academy. Air Traffic Services (ATS) are provided by M/s AAI and the watch hours available for 24 hours. Airport emergency services responded immediately for the service of involved aircraft and the crew.

1.11. Flight Recorders

The aircraft is not equipped with CVR and DFDR, and is not mandated as per regulations.

1.12. Wreckage and Impact Information

The aircraft landed on runway 32 at 08:08 hrs. Touchdown was normal as per reports and during landing roll, a/c steered to the left and went out of the runway. The aircraft finally came to a halt on the soft ground at 110m from runway centerline. No components/ parts of the aircraft got detached or damaged due to the impact and therefore no wreckage.

1.13. Medical and Pathological Information

The flight cadet was subjected to Breath analyzer test for presence of alcohol and was found negative.

1.14. Fire

There was no fire before or after the incident

1.15. Survival Aspect

The incident took place on the airport and No search and rescue was required. After the incident the Flight Cadet came out of the aircraft unhurt.

The Incident was survivable.

1.16. Organizational and Management Information.

M/s Rajiv Gandhi Academy for Aviation Technology (RGAAT), Trivandrum is an institution owned by the Government of Kerala. The training academy is approved by DGCA, Gov. of India. It is located in Trivandrum airport where local flying activities are carried out.

The institute has a total of 04 Cessna 172 - R aircrafts which is maintained by The organization holds a DGCA approved Training and Procedure Manual meant to be an approved reference document for imparting flying training.

Flying training was suspended for 15 months (from December 2015 to March 2017) due to non-availability of Chief Flying Instructor (CFI). Flying activities resumed consequent to appointment of a DGCA approved CFI

1.17. Additional Information

Nil

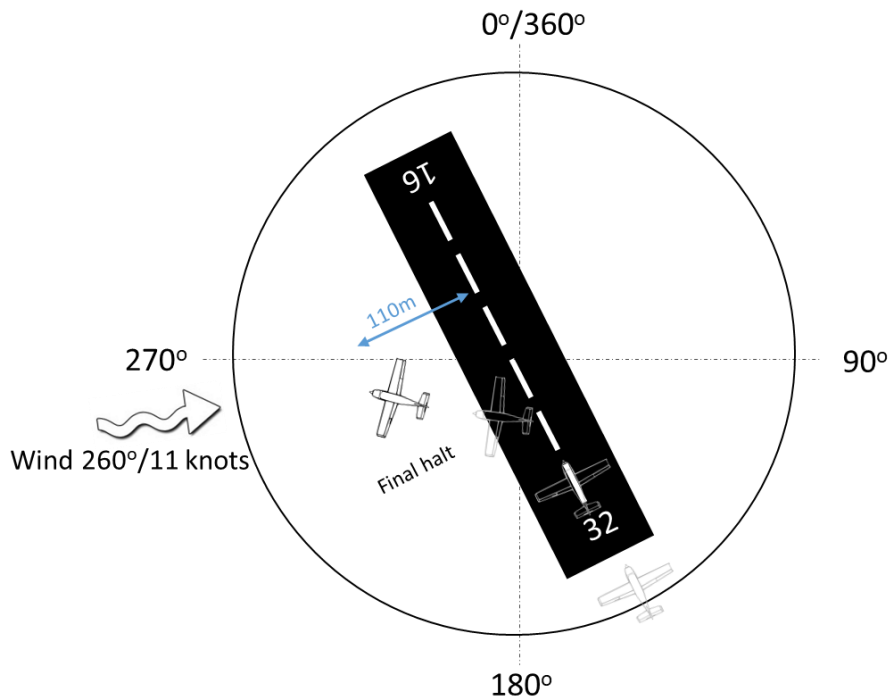
1.18. Useful or Effective Investigation Techniques used

Nil

2. ANALYSIS

2.1. Aircraft Handling by the flight crew:

The flight cadet was authorized by the CFI for carrying out a solo Circuit and Landing exercise at Trivandrum. Three touch and go exercises were carried out which was uneventful. During approach on Runway 32 for full stop landing, the wind reported was 260°/ 11 knots. As per the flight cadet, the aircraft made final approach with flaps selected at 30° and speed of around 70 knots.



The aircraft touched down on the runway center line. Due to wind of 260° with a speed of 11 knots the aircraft drifted towards the left. The flight cadet in an attempt to align the aircraft back to the centerline had given incorrect rudder input to the left. Due to this attempt the aircraft went out of the runway leading to a runway excursion.

During this time the flight cadet controlled the aircraft and the aircraft came to a halt at 110m to the left of runway centerline. The flight cadet immediately informed the ATC and requested for assistance.

As per his FTPR, his flying performance was consistent and satisfactory.

Therefore handling of aircraft by the flight cadet is considered as a factor to the incident.

2.2. Maintenance of the aircraft

After the incident, all the control surfaces were inspected for its effectiveness. It was observed that the movement of Rudder was out of limits.

As per AMM, the deflection/ movement of the rudder Left and Right side should be between 5.29" to 5.9" from the Rudder idle position, whereas LH side was deflection beyond AMM limits. This eventually creates excessive yaw moment towards the left.

AMM calls for Rudder control system check at every 50, 100 and 600 Hrs. Aircraft has flown 35:55 hrs since last 600 Hrs. inspection, hence no inspection was found due.

Therefore, excessive moment of rudder is a factor to the incident.

2.3. Weather

Weather reports were issued by IMD for Trivandrum Airport. The aircraft took off at 0738 Hrs. and landed at 0808 Hrs..

At the time of landing, the weather prevailing was Wind 260°/ 11 knots with 6 Km visibility. The cross wind component during landing was 10 knots. As per Organization's Training Program Manual, the limitation for cross wind component for Student Solo flight is 8-10 knots.

Flight cadet's handling of aircraft was in response to the weather prevailing during landing, but weather cannot be taken as a factor to the incident.

3. CONCLUSION:

3.1. Findings

- 3.1.1. The aircraft had a valid Certificate of Airworthiness.
- 3.1.2. The airworthiness review certificate was valid at the time of the incident.
- 3.1.3. Daily inspection was carried out by approved Aircraft Maintenance Engineer in the morning of 03-04-2017.
- 3.1.4. There was no scheduled maintenance due for the aircraft.
- 3.1.5. There was no snag reported on the aircraft prior to the incident.
- 3.1.6. The Flight Cadet was authorized by the CFI was carrying out flying exercises and was current on flying training on Cessna 172R.
- 3.1.7. The aircraft was loaded within the limits.
- 3.1.8. First flight of the day for the Flight cadet was with the CFI in which Flight cadet's performance was found satisfactory.
- 3.1.9. The Flight cadet was authorized for second sortie with four touch and go exercises. First three touch and go were uneventful, fourth landing was an incident.
- 3.1.10. Wind at the time of incident was 260°/ 11 knots with 6 Km visibility.
- 3.1.11. Aircraft landing on Runway 32, after landing the aircraft steered to the left of the runway and came to a halt at 110 to left of runway centerline.
- 3.1.12. The rudder travel was found beyond AMM limits.
- 3.1.13. There was no damage to the aircraft and any structures in the aerodrome.
- 3.1.14. The flight cadet was subjected to post flight medical test and was found negative for influence of alcohol.
- 3.1.15. All airport emergency services responded promptly to the incident.
- 3.1.16. There was no injury to any persons on board and on ground, and there was no fire before and after the incident.
- 3.1.17. Prior to the incident, the student pilot had a total of 42:15h of flying experience, of which 03:25h was solo.

3.2. Causes

- 3.2.1. The cause of the incident was due to Flight Cadet's incorrect handling of flight controls during cross wind landing.
- 3.2.2. The excessive rudder travel to the left has amplified the yaw moment of the aircraft.

4. SAFETY RECOMMENDATIONS

- 4.1.1. Suitable corrective flying training to be imparted to the Flight Cadet.
- 4.1.2. M/s RGAAT shall carry out one time inspection of Rudder travel check for entire Cessna 172R.
- 4.1.3. Digital Inclinator to be used for carrying out Rudder travel check for more accurate measurements.



Veeeraragavan K
Air Safety Officer
Inquiry Officer: VT-RGV

Date : 30th October 2017
Place : Chennai