FINAL INVESTIGATION REPORT ON SERIOUS INCIDENT TO M/S MP FLYING CLUB CESSNA-172S AIRCRAFT VT-MPF ON 10.03.2023 AT INDORE

GOVERNMENT OF INDIA
OFFICE OF DEPUTY DIRECTOR GENERAL OF CIVIL AVIATION
(WESTERN REGION)
INTEGRATED OPERATIONAL OFFICE COMPLEX, SAHAR ROAD,
VILEPARLE (E), MUMBAI – 400099

Foreword

In accordance with Annex 13 to the Convention on International Civil Aviation Organization (ICAO) and Rule 13(1) of Aircraft (Investigation of Accidents and Incidents), Rules 2017, the sole objective of the investigation of an incident shall be the prevention of accidents and incidents and not to apportion blame or liability.

This document has been prepared based upon the evidences collected during the investigation, opinion obtained from the experts, etc. The opportunity was accorded to all the parties to participate during the course of investigation. Consequently, the use of this report for any purpose other than for the prevention of future accidents or incidents could lead to erroneous interpretations.

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ABBREVIATIONS	
AME	Aircraft Maintenance Engineer
AMM	Aircraft Maintenance Manual
AMP	Aircraft Maintenance Program
AOP	Air Operator Permit
ARC	Airworthiness Review Certificate
ATC	Air traffic Control
ATIS	Automatic Terminal Information Service
CAR	Civil Aviation Requirements
CAMO	Continuing Airworthiness Management Organisation
CCTV	Closed Circuit Television
C of A	Certificate of Airworthiness
C of R	Certificate of Registration
CFI	Chief flight Instructor
CG	Centre of Gravity
C/L	Circuit and Landing
DME	Distance Measuring Equipment
DVOR	Doppler Very High Frequency Omni Range
ft	Feet
FRTO	Flight Radio Telephony Operator
FTO	Flight Training Organization
FTPR	Flying trainee's progress record
gpf	Grams per Fuel Flow
GPS	Global Positioning System
hrs	hours
IAS	Indicated Air Speed
ILS	Instrument Landing System
kt	Knot
min	minutes
MET	Meteorological information management
MPFC	Madhya Pradesh Flying Club
Operator	AOP holder of the incident aircraft
POH	Pilot Operating Handbook
RWY	Runway
SOP	Standard operating procedure
SPL	Student Pilot licence
TPM	Training & Procedure Manual
TXY	Taxiway
UTC	Coordinated Universal Time
VOR	VHF Omnidirectional Radio Range

FINAL INVESTIGATION REPORT ON SERIOUS INCIDENT TO M/S MP FLYING CLUB CESSNA-172S AIRCRAFT VT-MPF ON 10.03.2023 AT INDORE

GENERAL INFORMATION

1	**Aircraft**	Type	Cessna
		Model	172S
		Nationality	Indian
		Registration	VT-MPF
2	**Owner and Operator**	M/s Madhya Pradesh Flying Club Ltd	
	Pilot-in command	Student Pilot licence (SPL) holder	
3	**Extent of Injuries**	Nil	
4	**Date & Time of Incident**	10.03.2023 & 11:40hrs UTC approx.	
5	**Place of Incident**	Indore Airport	
6	**Co-Ordinates of Incident Site**	Latitude 22°43'24"N Longitude 75°48'20"E	
7	**Last Point of Departure**	VAID (Indore Airport)	
8	**Intended place of landing**	VAID (Indore Airport)	
9	**No. of Passengers on Board**	Nil	
10	**Type of Operation**	Training flight (Solo)	
11	**Phase of Operation**	Landing	
12	**Type of Incident**	Runway Excursion	

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

SYNOPSIS

On 10.03.2023, VT-MPF, CESSNA-172S aircraft of M/s Madhya Pradesh Flying Club was planned for a routine training sortie of circuit and landing (C/L) commanded by a Trainee Pilot within the local flying area of Indore Airport. The first circuit and landing was uneventful. Trainee Pilot proceeded for second circuit and landing.

During second circuit and landing, after completion of the circuit, the approach was carried out and further after touchdown, the aircraft started veering to the right, went out of the runway (RWY), crossed Taxiway (TWY) D and stopped on unpaved area adjacent to TWY D.

Thereafter, the incident was reported to ATC, Indore and to authorizing instructor for assistance. There were no injuries reported, there was neither smoke nor fire after the incident. Aircraft was recovered.

The incident was reported to DGCA and further, the investigation was instituted under Rule 13(1) of Aircraft (Investigation of Accidents and Incidents) Rules 2017 by appointing Investigator-in-Charge.

The cause was attributed to improper handling of the aircraft flight controls during the final approach and landing roll, as well as the improper go-around attempt while the aircraft was veering to right contributed to the incident.

1. FACTUAL INFORMATION:

1.1 History of Flight:

On 10.03.2023, 05 sorties were operated by other trainee pilots on VT-MPF aircraft before the incident sortie, and no snags were reported for these sectors. This was the sixth sortie for the aircraft on that day.

Trainee pilot reported at 08:45hrs and carried out Breath Analyser test, daily inspection of aircraft and uplifted the fuel for the training flight. The total Fuel on board was 160litres. The aircraft pre-flight checks were conducted by the trainee pilot, and they were found to be satisfactory. He was briefed by Assistant Flight Instructor regarding the flight. The trainee pilot was authorized by the Chief flight Instructor (CFI) to carry out solo routine training flight of circuit and landing (C/L) exercise for 30min within the local flying area of Indore Airport.

The aircraft became airborne from Runway 25 at 11:26hrs UTC. The first circuit and landing of the trainee pilot was uneventful. No issues were reported with the aircraft during the first C/L. The trainee pilot proceeded for second C/L.

The aircraft took off from RWY 25. After completing a circuit, it approached RWY 25 for second landing with 20° flap configuration. After flaring over RWY 25, the trainee Pilot felt the aircraft was unstable (rolling to right about its longitudinal axis). Therefore, an attempt made to initiate a Go-around with flap 20° flap configuration despite the intention to land the aircraft; to stop and go for another circuit. However, by that time, the aircraft right wheel had already touched down on RWY 25 with the left wheel still in the air, and it started veering to the right even though the rudder pedals were applied to maintain the runway centreline as stated by the trainee pilot. Hence, the go-around was discontinued and efforts were made to stop the aircraft by applying brakes after reaching below 40kt IAS (without differential braking). However, the aircraft did not stop and went out of the runway. When the left wheel made contact with the ground, the aircraft was already on taxiway 'D'. It then crossed TWY 'D' and finally came to a halt abruptly on a concrete drain slab in the unpaved surface area adjacent to TWY D, resulting in damage to the propeller blade tips and one runway edge light.

The trainee pilot switched off ignition as well as Master Switch and informed ATC for assistance. The trainee pilot came out of the aircraft by himself. There was no injury to the trainee pilot and neither smoke nor fire or any fuel leak was observed post incident. The fire service team, medical team and AAI security guards responded to the site. The aircraft was removed and taken to the hanger for damage assessment under the intimation to DGCA.

1.2 Injuries to Persons :

Injuries	Crew	Passengers	Others
Fatal	Nil	Nil	Nil
Serious	Nil	Nil	Nil
Minor/None	0/1	Nil	

1.3 Damage to Aircraft:

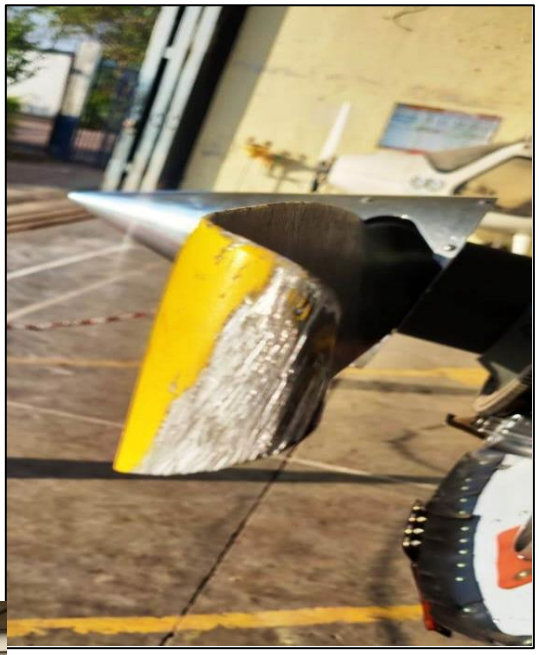
The following damages were sustained by the aircraft when it went out of the runway on the unpaved surface:

- Propeller blade Tips found bend. Refer Photograph# 1 & 2.
- Left Horizontal Stabilizer skin found deformed. Refer Photograph# 3.
- Scratch marks found on bottom surface of the Right Landing gear strut. Refer Photograph# 4.

1.4 Other Damage:

One of the runways Edge light near to Taxiway 'D' was found damaged. Refer Photograph# 5.

(Photograph# 1- Propeller blade Tip found bend)



(Photograph# 2- Propeller blade Tip found bend)

(Photograph# 3-Left Horizontal Stabilizer skin found deformed)

(Photograph# 5- One of the runways Edge light near to Taxiway 'D' was found damaged)

(Photograph# 4- Scratch marks found on bottom surface of the Right Landing gear strut)

1.5 Personnel Information:

1.5.1 Trainee Pilot

The details of the licenses and ratings are as follows:-

Age	: 31yrs
License	: Student Pilot License (SPL)
Date of issue	: 02.09.2022
Valid up to	: 01.09.2032
Category	: Aeroplane
Date of medical Exam	: 10.08.2022
Medical Exam valid up to	: 09.08.2023
Date of issue of FRTO license	: 18.10.2022
FRTO license valid up to	: 17.10.2032
Endorsements	: Cessna 172S
Experience on Type	: 32:55 hrs
Experience as trainee Pilot on Type	: 32:55 hrs
Total flying experience during last 1 year	: 32:55 hrs
Total flying experience during last 6 month	: 28:35 hrs
Total flying experience during last 30 days	: 10:30 hrs
Total flying experience during last 07 days	: 03:00 hrs
Total flying experience during last 24 hours	: 0:20 hrs
Rest Before the incident flight	: more than 24 hrs

Breathe Analyser Test was done by Trainee Pilot before the sortie and the result was Negative. He was current in flying and had adequate rest prior to operating the incident flight. He was not involved in any serious incident/ accident in the past.

1.6 Aircraft Information:

Type and Model of Aircraft	: Cessna 172S
Aircraft Serial No	: 172S12570
Year of Manufacturing	: 2020
Engine Type	: IO-360-L2A
Engine Serial No	: L-38490-51E
Certificate of Registration	: 5295
Certificate of Airworthiness	: 7425
Category & Sub division	: Normal & Passenger
Max. AUW	: 1157 Kg
ARC Validity	: 10-06-2023
Aircraft Hours since New	: 2153:40hrs
Total time since ARC	: 1018:30hrs
Engine Hours since new	: 2153:40hrs

Propeller Installed : McCauley 1A170E/JHA 7660

Propeller Hours since new : 2153:40hrs

Type of fuel : 100 LL AVGAS

1.6.1 The airplane is all metal, high wings; single engine airplane equipped with tricycle landing gear and is designed for general utility and training purposes.

1.6.2 As per Load and trim sheet, the All up weight of the aircraft and CG was found within limits.

1.6.3 There were Nil Snags/ Defect reported in the last one month prior to this incident.

1.6.4 The Last Major scheduled inspections were carried out as a part of maintenance work in the following Table: 1:

Table: 1

Inspections details	On	Airframe Hrs.
Inspection Operation 03 & 13	04-03-2023	2128:35
Inspection Operation 02 & 13	22-02-2023	2078:35
Inspection Operation 01 & 13	13-02-2023	2028:40

1.6.5 The last control rigging carried out on the aircraft was on 07.02.2023.

1.6.6 The tyre pressure and tyre condition inspection was last done on 22-02-2023.

Following external checks were carried out by the AME after the incident:

1.6.7 Movement of Rudder, Aileron, Horizontal Stabilizer, Flaps positions were checked, found within AMM limits.

1.6.8 Following Table: 2 shows the results of Cable tension test carried out on Flight controls surfaces, found within limits:

Table: 2

S/No.	DESCRIPTION	AMM REF	OBERSVED VALUE
01.	FLAP	30 +/- 10 LBS	31 LBS
02.	AILERON	40+/- 10 LBS	36 LBS
03.	ELEVATOR	30 +/- 10 LBS	30 LBS
04.	ELEVATOR TRIM TAB	20 +0/-5 LBS	18 LBS

1.6.9 Brakes application was checked on the apron, found satisfactory.

1.6.10 Serviceability and condition of Brake system found satisfactory.

1.6.11 No abnormality noticed in the aircraft tyres. Tyre pressures were found normal.

1.6.12 Engine was replaced during post flight rectification.

1.6.13 There was no other defect observed on the Aircraft.

1.7 Meteorological Information:

The MET data was provided by Indore Airport was available in every half an hours. It was also available to trainee Pilots through ATIS. Time of the incident was 11:40hrs UTC. The forecasted weather is as follows: Refer Table: 3

Table: 3

Time (UTC)	**11:00**	**11:30hrs**
Wind	340°/05kt	320°/03kt
Visibility	7km	7km
Cloud	FEW 2500ft (750m)	FEW 2500ft (750m)
Temperature	30^0C	30^0C
QNH	1016 hPa 30.00 INS	1016 hPa 30.01 INS
Dew Point	06^0C	06^0C

At the time of incident, Weather was predicted calm (Wind 320°/3kt, Visibility: 7km, No Significant clouds).
Actual weather while landing was wind calm with 4°/4kt. Incident took place at day light condition (~1hr prior to sunset).

1.8 Aids to Navigation:

Indore Airport is installed with navigation aids like DVOR, DME (VOR), DME (ILS), Localizer, Glide path of ILS Cat. I for landing on Runway 25.
Aircraft is Equipped with Garmin G1000 Avionic System, which is an integrated flight control and navigation system. The system combines primary flight instruments, communications, aircraft system information and navigational information. ILS (localizer, glide path, and marker) receivers, VOR Receiver, ATC Transponder, Emergency locator transmitter, GPS receiver, were fitted on the aircraft for navigation purpose.

1.9 Communication:

The aircraft was always in two way communication with ATC, Indore on frequency 122.8 MHz. There was no snag reported in the communication system of either the aircraft or the ATC.

The relevant portion of VHF R/T where the aircraft was in contact with ATC on frequency 122.8 MHz has been reproduced below in Table: 4 from the ATC Tape transcript:

Table: 4:

TIME (hrs) UTC	STATION CALLING	STATION CALLED	CONVERSATION
11:31	VT-MPF	TWR	TOWER VT-MPF ON FINAL REQUEST STOP & GO
	TWR	VT-MPF	RUNWAY 25 CLEARED TO LAND WIND 04°/04kt
11:34	VT-MPF	TWR	LINE UP 25, READY FOR DEPARTURE
	TWR	VT-MPF	VT-MPF RUNWAY 25 CLEARED FOR TAKEOFF WIND CALM
	VT-MPF	TWR	CLEARED FOR TAKE-OFF RUNWAY 25
11:35	VT-MPF	TWR	LEFT DOWN WIND RUNWAY 25
	TWR	VT-MPF	REPORT FINAL RUNWAY 25
	VT-MPF	TWR	REPORT FINAL RUNWAY 25
11:38	VT-MPF	TWR	ON RUNWAY 25, REQUEST FOR STOP & GO
	TWR	VT-MPF	VT-MPF CLEARED TO LAND WIND CALM
	VT-MPF	TWR	CLEARED TO LAND RUNWAY 25
11:40	VT-MPF	TWR	LANDED OUT OF RUNWAY
	TWR	VT-MPF	SAY AGAIN
	VT-MPF	TWR	LANDED OUT OF RUNWAY SIR COULD NOT CONTROL THAT
	TWR	VT-MPF	ROGER WAIT, WILL GIVE THE ASSISTANCE.
11:41	VT-MPF	TWR	OK SIR
	TWR	VT-MPF	VT-MPF SAY AGAIN, HOW MANY ASSISTANCE REQUIRED
	VT-MPF	TWR	ASSISTANCE REQUIRED TO TAKE THE AIRCRAFT BEHIND.
11:41	TWR	VT-MPF	CONFIRM OPERATIONS NORMAL
	VT-MPF	TWR	ALL OPERATIONS NORMAL SIR
	TWR	VT-MPF	ROGER STANDBY, WE ARE SENDING THE JEEP
11:41	TWR	VT-MPF	CONFIRM WE CAN SEND THE FIRE PERSONNEL TO NEAR TO THE AIRCRAFT
	VT-MPF	TWR	AFFIRM SIR

1.10 Aerodrome Information:

The Indore Airport is an International Airport (ICAO Code: VAID), which is named as Devi Ahilyabai Holkar Airport. It is a public aerodrome operated by Airports Authority of India. It has one runway with designated Runway ends: 07 and 25. Refer Photograph 6. The runway physical characteristics are mentioned in Table: 5 below. Last Runway Surface Friction Testing was carried out on 21.02.2023, friction values were found above Minimum acceptable friction level and Maintenance planning level.

(Photograph# 6-Indore Airport Runway)

Table: 5

	RWY 25	**RWY 07**
Dimensions of RWY (m)	2754 x 45	2754 x 45
Type	Precision approach	Non precision approach
Orientation (°)	245	69
Slope of RWY	0.71% (Long)- 1.5% (Trans.)	0.71% (Long)- 1.5% (Trans.)
Strip dimensions (m)	2874 X 280	2874 X 280
RESA (m)	90 x 90	90 x 90
Elevation of Threshold	1839 ft	1838 ft

At the time of incident, Runway 25 was in use. During post incident runway inspection, one of the runways Edge light near to Taxiway 'D' was found damaged.

1.11 Flight Recorders:

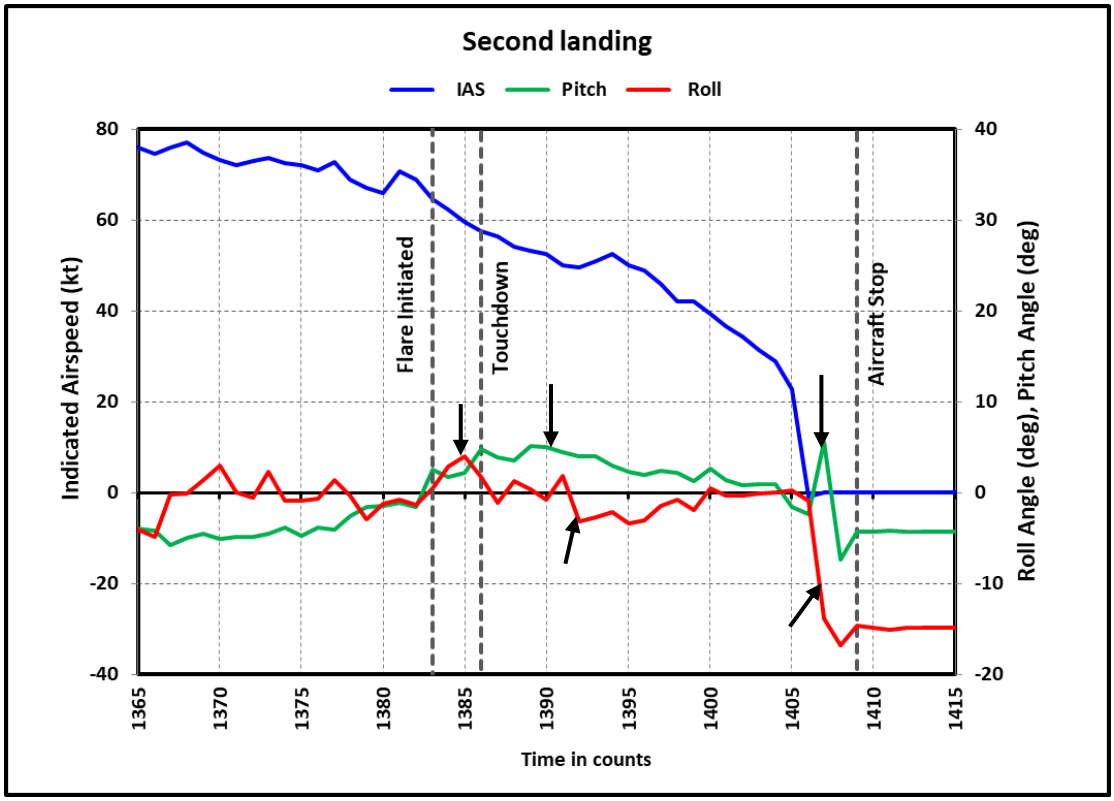
The aircraft is not equipped with either a Cockpit Voice Recorder or a flight data recorder as the same is not mandated in CAR. However, the aircraft is equipped with Garmin G1000 avionics system which records and stores the basic flight parameters in a memory card. This recorded data can be visualized in 3D View to see the flight profile using Cloud Ahoy software. The brake parameters and flap positions are not recorded in the Garmin data. Sequential events of incident sortie noticed from this recorder are given in the following table 6.

Table: 6

TIME in hrs (UTC)	**EVENTS**
11:26:01	Aircraft take off initiated for first C/L
11:32:30	Aircraft touchdown with indicated airspeed (IAS)=48kt, Engine fuel flow= 0.85, Engine rpm=808.4
11:32:55	Aircraft taxi stopped after first C/L
11:33:11	Aircraft take off initiated for second C/L
11:38:25 to 11:39:14	During the final approach, an average approach speed of 77kt IAS was observed at around 500ft above ground level till RWY 25 threshold, with speeds ranging from 82 to 67kt IAS.
11:39:15	During landing, RWY Threshold Crossing speed was 66kt, where the RWY25 threshold is obtained from Latitude and Longitude of Garmin data.
11:39:18	Flare initiated as Pitch started seen increasing to positive value
11:39:20	Aircraft rolled to right about its longitudinal axis with maximum 4° angle for one second.
11:39:21	Aircraft touchdown with IAS= 57kt, which is 800ft from RWY 25 threshold, Roll angle=1.69°, pitch angle=4.79°, Heading=253°, Engine fuel flow= 0.8gph, Engine rpm=951.

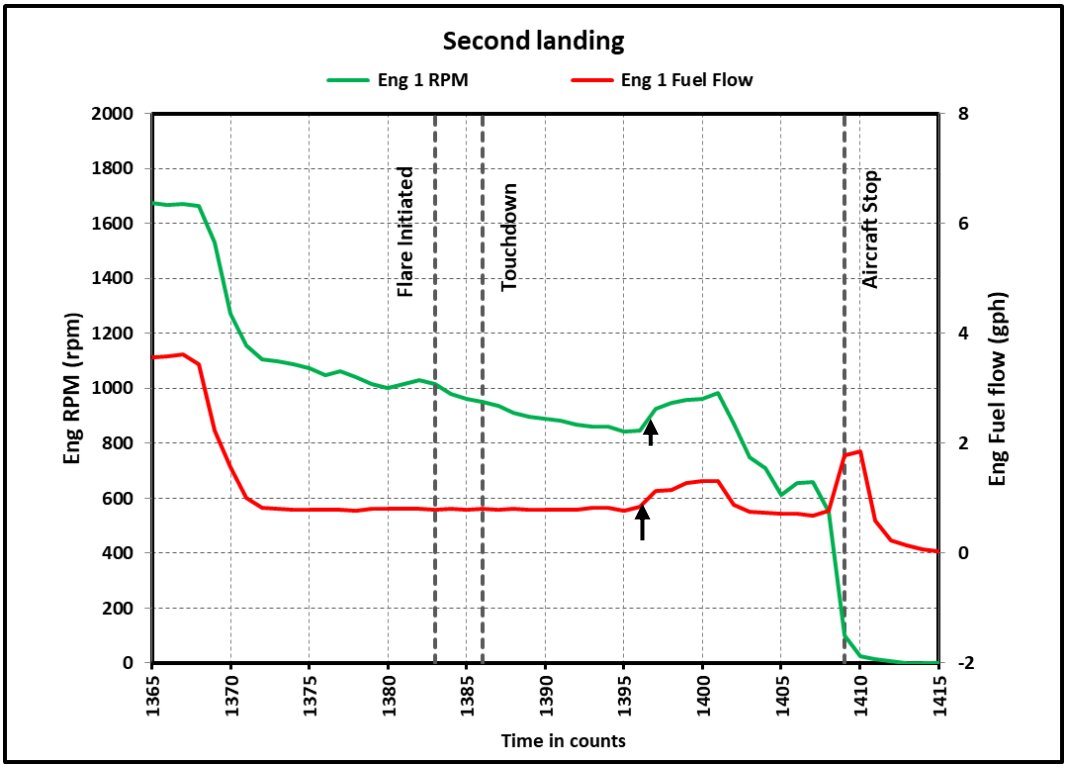
11:39:27	Aircraft slightly tilted to left for next 8 seconds with maximum -3.4° angle for one second.
11:39:30	Heading= 251.5°, Engine fuel flow= 0.78gph, Engine rpm=842. The fuel flow seen increasing for 8 seconds and further reduced. Simultaneously, the same trend noticed in engine rpm also. Max value noticed during this 8 seconds in fuel flow=1.32gpf and engine rpm=983. IAS=50.11kt
11:39:30 to 11:39:43 (14 seconds)	a. A variation in normal acceleration is also observed. b. Positive lateral acceleration was prevalent c. Heading change noticed from 251.5° to 305° in duration of 14 seconds.
11:39:44	Ground speed became zero and aircraft stopped.

The graphs relevant to the incident during landing of second C/L sortie are shown below in Graphs 1, 2 & 3:



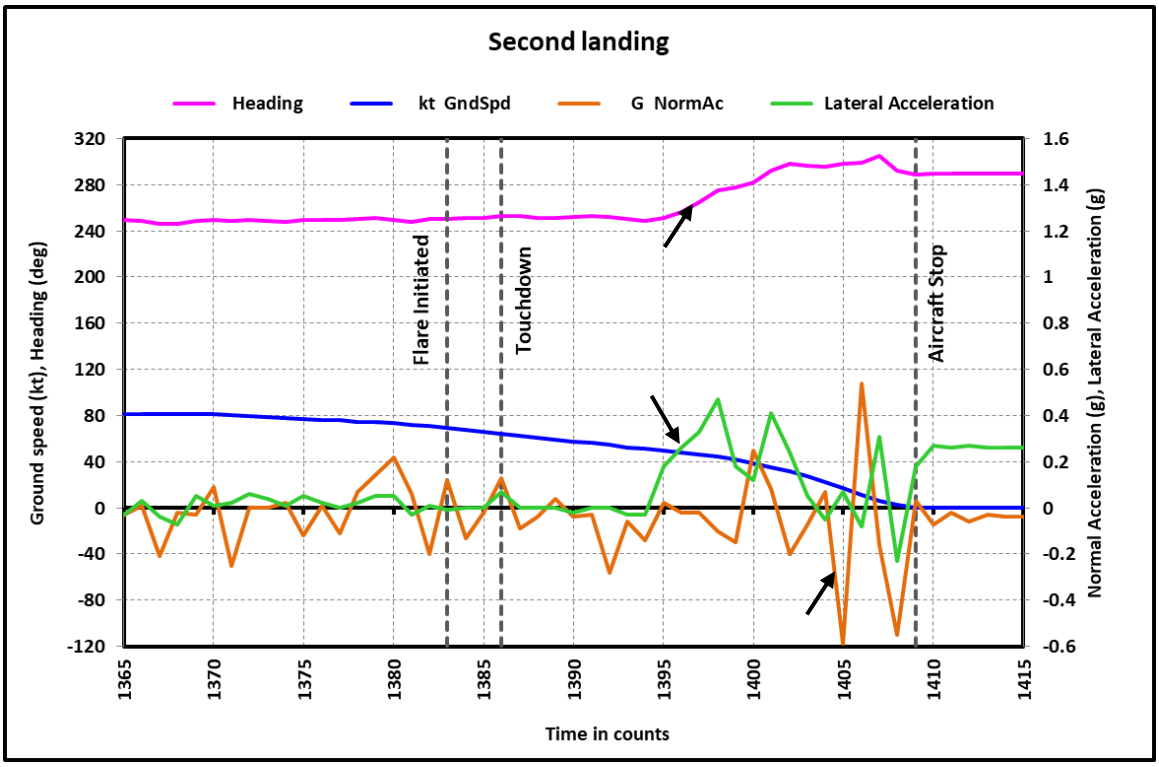
Graph: 1

The graph 1 depicts that in the final approach, the flare was initiated where the pitch is seen increasing towards positive value. During this process, aircraft was slightly rolled to right about its longitudinal axis with positive value of maximum 4° and soon the aircraft touched down with 57kt IAS. Further, aircraft slightly tilted to left for 8 seconds. Finally, aircraft's pitch and roll abruptly varied during the stop.



Graph: 2

The graph 2 depicts that 10 seconds after touchdown, a slight increase in engine fuel flow is observed along with engine RPM, which is then seen to decrease.



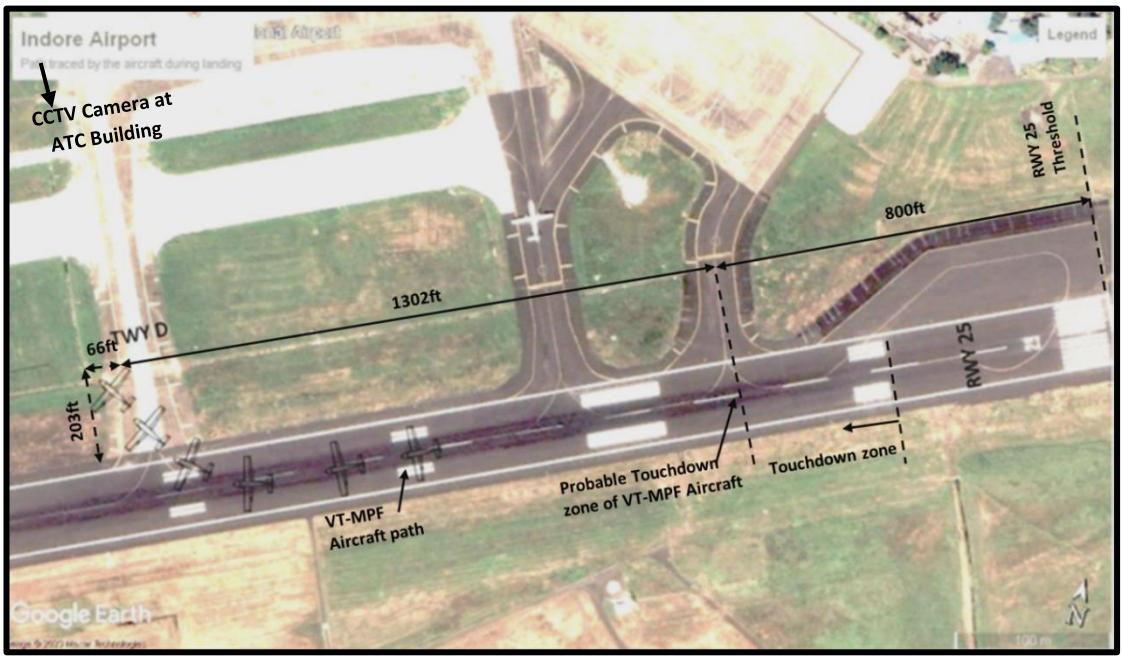
Graph: 3

The graph 3 indicate that 10 seconds after touchdown, the aircraft seen yawed/veered towards right side with positive lateral acceleration and observed variations in normal acceleration. During this time, the aircraft heading was also changed from 251.5° to 305°. Further, aircraft was brought to stop abruptly where ground speed became zero.

1.12 Wreckage & Impact Information:

After touchdown approximately 800ft from the RWY 25 threshold (between first and second touchdown zones), the aircraft was moving along the runway centreline. Further, the aircraft was veering right, decelerating, going out of the RWY 25 (approximately 1924ft from RWY 25 Threshold), crossed TWY D, entered unpaved surface and halted on a concrete slab (drain cover), which was near to the RWY sign boards. The final aircraft stopping position was at 203ft to the right of the nearest runway edge and 2168ft from the RWY 25 threshold. The actual point of touchdown could not be identified from the runway due to the absence of tyre markings or from CCTV footage, as the visuals were not available from the RWY 25 threshold. Hence, the approximate touchdown point mentioned above was obtained from the latitude/longitude data from Garmin system. The aircraft path is simulated in the Photograph 7. There was no wreckage.

One of the runways edge light near to Taxiway 'D' was found damaged, which was 1936ft from RWY 25 Threshold. There were no tyre marks (brake application), propeller hit marks found on the runway. Tyre marks were found on the TWY D and on unpaved surface. Propeller strike marks were visible on the concrete slab where the aircraft finally stopped. Refer Photograph 8.



(Photograph# 7)

(Photograph# 8)

1.13 Medical & Pathological Information:

Not Applicable.

1.14 Fire:

There was no pre/post incident fire or smoke reported. However, Airport emergency services arrived at the site to meet any emergency.

1.15 Survival Aspects:

The incident was survivable. There was no injury to the trainee pilot or any other person outside the aircraft.

1.16 Test and Research:

Not Applicable

1.17 Organizational & Management Information:

The Madhya Pradesh Flying Club Ltd, is approved by DGCA under FTO. It operates Cessna 152, 172, P68 C and Beech Baron G 58 (fleet 9) at Indore and Bhopal. The AOP of the organization is valid till 20.03.2024. M/s MPFC is further approved for the maintenance under CAR M Sub Part F and also for managing continuing airworthiness (CAMO under Sub Part G of CAR M) of the aircraft owned/operated by the organization. There were total 6 flight Instructors posted in the organization including one Chief flight Instructor for providing the flight training to the trainee pilots.

1.18 Additional Information:

1.18.1 CCTV Footage:

A CCTV camera placed on the ATC building (refer Photograph 7) captured the incident, by which aircraft direction, speed, route traced can be seen. However, the video lacks clarity as it is captured from wide shot. Hence, the control surface positions were not visible. The aircraft final approach, RWY 25 crossing threshold, flaring and the touchdown zone were also not available in the CCTV footage. The sequences of events captured in the CCTV are as follows:

- At 11:39:23hrs UTC to 11:39:44hrs UTC, the aircraft was observed moving along the RWY 25 centerline, approximately 1100ft from the RWY 25 threshold (after second touchdown zone). Further, it was seen veering right, decelerating, cutting across TWY D, entering an unpaved surface, and halting on a concrete drain slab. The propeller remained in rotation until it struck the unpaved surface
- At 11:40:11hrs UTC, An Indigo Aircraft was spotted in the RWY 25, was ready for departure.
- At 11:41:10hrs UTC, Airport emergency services reached and responded at the site.
- At 11:42:33hrs UTC, the trainee pilot came out of the aircraft.
- At 11:46:16hrs UTC, The Indigo Aircraft took off from the RWY 25

1.18.2 Excerpts from Pilot Operating Handbook

As per POH, the normal approach airspeed which ranges between 65-75kt for flaps up (0°) configuration and 60-70kt for flap full (30°) configuration.

1.18.3 Excerpts from Training Procedural Manual (TPM)

As per TPM Circuit pattern, the normal approach airspeed is 70kt and Runway threshold crossing speed is 60kt for flap 20° configuration.

1.18.4 Excerpts from flying trainee's progress record (FTPR):

As per the Flying trainee's progress record (FTPR) available with the FTO, the trainee Pilot had started his flying training at M/s Madhya Pradesh Flying Club on 07.09.2022 and had operated his first solo flight on 04.01.2023. He was released for solo flying after completing 19hrs of dual flying with an instructor, which included 3 practice sessions of go-arounds. His total solo flying experience till the date of incident was 06:40 hrs. A total of 43 sorties were flown by him with an instructor, out of which 25 sorties were C/L. There were a total of 11 solo sorties flown by him, and out of which 7 sorties were C/L.

Also as per records, the instructors observed that the trainee pilot had issues to maintain stable approach. He was maintaining high speed during approach and high flare during their landing checks done in the last two months. However, these issues had been identified, briefed and corrected in subsequent flights and released him upon trainee pilot's satisfactory performance.

1.19 Useful and Effective Techniques:

NIL

2. ANALYSIS:

On 10.03.2023, VT-MPF, CESSNA-172S aircraft of M/s Madhya Pradesh Flying Club had a runway excursion while carrying out a circuit and landing by a trainee pilot at Indore Airport.

2.1 Engineering Aspects:

The aircraft had a valid C of A, C of R, and ARC and was being maintained according to the approved AMP. The last scheduled maintenance inspection was an Inspection Operation 03 & 13, which was carried out on 04.03.2023. There were nil Snags/ Defect reported in the last one month prior to this incident.

The incident flight was the sixth sortie on that day for the aircraft and no snag/defect was recorded in the journey log book of previous 5 sorties operated by the other trainee pilots. In the sixth sortie, this was the second C/L of the day for the trainee pilot. He had not reported any issues with the aircraft in his first C/L. As per Load and trim sheet, the all up weight of the aircraft and CG was found within limits. The aircraft was released after satisfactory pre-flight inspection by the trainee pilot and there had not been any persisting snags on the aircraft on 10.03.2023.

After the incident, a thorough examination of the aircraft's flight controls, including their movements, was conducted and found to be within the acceptable Aircraft Maintenance Manual (AMM) limits. Additionally, the serviceability and condition of the brake system and tires were assessed and found to be satisfactory. As a result, it can be inferred that the serviceability of the aircraft was not a contributing factor to the incident.

2.2 Operational Aspects:

The analysis of the aircraft handling aspects was conducted based on the basic parameters recorded in the Garmin system, the trainee pilot's statement, CCTV recordings and ATC Tape transcripts.

The trainee pilot was medically fit and well-rested before operating the flight. His Breath Analyser records indicated that he was not under the influence of alcohol. He had been authorized by the CFI to conduct the solo circuit and landing exercise. The first circuit and landing sortie performed by the trainee pilot was uneventful.

The second take off was also uneventful. During the final approach, the trainee pilot configured the flaps to 20°, completed the necessary checklist, and maintained an average approach speed of 77kt IAS at around 500ft above ground level till RWY 25 threshold, with speeds ranging from 82 to 67kt IAS. This approach speed was slightly higher than the normal approach airspeed of 70kt IAS for flap 20° configuration as per the TPM.

RWY 25 was aligned and crossed its threshold at a speed of 66kt IAS, which was slightly higher than 60kt IAS referenced in the Circuit pattern as per the TPM. After crossing the RWY threshold, the flare was initiated by him using the control column. During this time, aircraft pitch increased and aircraft slightly rolled 4° angle to right about its longitudinal axis. This aircraft roll to right is due to an improper flight control input given to the right by the trainee pilot using control column.

The aircraft touched down with a speed of 57kt IAS with heading 253° on RWY 25, initially on its main wheels and subsequently on the nose wheels. This aircraft roll to right might have led the trainee pilot to feel that the aircraft was unstable, and he perceived the right wing dropping during touchdown. As per the trainee pilot statement, the right wheel touched first and subsequently left wheel. This touch down occurred on the runway's centreline approximately 800ft from RWY 25 threshold.

It was stated by the trainee pilot that after touch down, the rudder pedal was applied to maintain the aircraft on the runway centreline and no differential braking was applied. However, 10

seconds after touch down, the aircraft veered to the right, as shown by increasing lateral acceleration and a change in heading towards the right. This occurred due to an improper flight control inputs given by the trainee pilot using the control column and rudder pedals.

Consequently 11 seconds after touchdown, an attempt to initiate a Go-around was made by the trainee pilot when the aircraft was on the runway with 50kt IAS, even though his initial plan was to land the aircraft and stop and then go for another circuit, which became evident from the increase in fuel flow and RPM. It was clarified by the trainee pilot that at the moment the go-around was initiated, the flap configuration was at 20°. Since, the aircraft had already started veering to the right; the trainee pilot discontinued the Go-around and kept the throttle in idle position. This decision became evident as the fuel flow began to decrease 17 seconds after touchdown. The trainee pilot's Go-around attempt led to an increase in engine RPM and caused the aircraft to veer right more rapidly. This was indicated by positive lateral acceleration, variations in normal acceleration and a sudden change in heading of around 50° to the right.

When the aircraft veered right rapidly, the trainee pilot attempted to stop the aircraft by applying brakes after reaching below 40kt IAS. However, the aircraft exited the RWY (approximately 1924ft from RWY Threshold), crossed TWY D, and came to an abrupt stop outside the runway on a concrete drain slab 24seconds after touchdown. The final aircraft resting position was at 203ft to the right of the nearest runway edge and 2168ft from the RWY 25 threshold. Thus, go-around attempt while the aircraft veering to right made the aircraft veer right faster and going out of the runway.

During this veering off, one of the runway edge lights near taxiway D was damaged by the aircraft.

Friction values on the runway were found to be within acceptable limits based on the last runway surface friction testing. Hence, runway friction is not a contributory factor to the incident.

Prior to the day of incident, the trainee pilot had accumulated ten solo sorties and a total of 6 hrs and 20min of flying experience, including six solo C/L sorties. Previous records from the Flight Training Progress Report (FTPR) indicated that he had issues with approach and flare during landing. However, these issues had been identified, briefed and corrected in subsequent flights as per TPM by CFI.

Based on the above, it is inferred that the runway excursion incident was caused by improper handling of the aircraft flight controls during the final approach and landing roll. Further, go-around attempt while the aircraft veering to right contributed to the runway excursion incident.

2.3 Weather Aspects:

At the time of the incident, visibility was above the minimum requirements, and the incident occurred during daylight conditions. Additionally, the weather was reported as calm and wind was 4°/4kt, which was within permissible limits. Therefore, weather conditions are not considered contributory factors to the incident.

3. CONCLUSION:

3.1 Findings

3.1.1 The aircraft had valid Certificate of Registration.
3.1.2 The Airworthiness Review Certificate was valid as on the date of incident.
3.1.3 The aircraft was airworthy at the time of the incident.
3.1.4 There were no snags or defects reported prior to this incident.
3.1.5 The trainee pilot had adequate rest prior to operating the incident flight.
3.1.6 Pre-flight Breath Analyser Test of the trainee pilot was negative.
3.1.7 Trainee pilot was authorized by Chief flight Instructor to carry out solo routine training sortie of circuit and landing (C/L) exercise.
3.1.8 On the day of the incident, there were five sorties operated by other trainee pilots prior to the incident sortie and no snags were reported for these sectors.

3.1.9 The trainee pilot conducted the pre-flight checks and found them to be satisfactory.
3.1.10 The aircraft was loaded within the CG limits.
3.1.11 The first circuit and landing sortie of the trainee pilot were uneventful.
3.1.12 The second take off was also uneventful.
3.1.13 In the second landing, the final approach speed and Runway threshold crossing speed maintained by the trainee pilot was slightly higher as per TPM.
3.1.14 While initiating a flare, the aircraft rolled to right about its longitudinal axis due to an improper flight control input given using control column.
3.1.15 The aircraft touched down within the touch down zone on the runway centreline.
3.1.16 After touchdown, the trainee pilot tried to maintain the aircraft on the runway centreline using the flight controls. However, the aircraft began veering to the right due to improper flight control inputs provided by the trainee pilot.
3.1.17 When the aircraft started veering right, a Go-around was attempted by the trainee pilot, which caused the aircraft to veer right even faster and going out of the runway.
3.1.18 The Go-around attempt was discontinued by the trainee pilot, and brakes were applied only at approximately 40kt IAS to stop the aircraft on the runway. However, the aircraft had already veered right, exited the RWY.
3.1.19 As per CCTV Footage, the aircraft was veering off right to the RWY 25, cutting across Taxiway D and halted abruptly on a concrete slab in the unpaved surface.
3.1.20 No abnormality observed in aircraft or in engine performance throughout this incident.
3.1.21 There were no indications of fire or smoke reported after the incident.
3.1.22 There is no injury reported to the trainee pilot or any outside person.
3.1.23 At the time of incident, Visibility was above minimum, Wind was within permissible limits.
3.1.24 Friction values were found within limits as per the Last Runway Surface Friction Testing.
3.1.25 During the post-incident inspection, the movement of control surfaces was checked and found to be within AMM limits. The serviceability and condition of the brake system and tyres were also found to be satisfactory.
3.1.26 As on the date of the incident, the trainee pilot had accumulated only a total of 6hrs and 40min of solo flying experience, which included seven circuit and landing (C/L) sorties.
3.1.27 As per trainee pilot's FTPR records, high approach speeds and high flare performance were noticed, which were briefed and corrected in subsequent flights as per TPM by CFI.

3.2 Probable causes

The runway excursion incident was caused due to Improper handling of the aircraft flight controls during the final approach and landing roll. Further, improper go-around attempt while the aircraft veering to right contributed to the incident.

4. SAFETY RECOMMENDATIONS

4.1 Action deemed fit by DGCA HQ based on findings made in the report.

Binitha Michael
Digitally signed by Binitha Michael
Date: 2024.10.24 17:28:10+05'30'

Date: 24.10.2024
Place: Mumbai

Binitha Michael
Assistant Director of Air Safety

----End of report----