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**FINAL INVESTIGATION REPORT ON
ACCIDENT INVOLVING TECNAM P2008JC AIRCRAFT VT-RBE
OPERATED BY M/S REDBIRD FLIGHT TRAINING ACADEMY
AT BARAMATI ON 20TH SEPTEMBER 2021.**



**Government of India
Ministry of Civil Aviation
Aircraft Accident Investigation Bureau,**

FOREWORD

In accordance with Annex 13 to the Convention on International Civil Aviation Organization (ICAO) and Rule 3 of Aircraft (Investigation of Accidents and Incidents), Rules 2017, the sole objective of the investigation of an accident shall be the prevention of accidents and incidents and not to apportion blame or liability. The investigation conducted in accordance with the provisions of above said rules shall be separate from any judicial or administrative proceedings to apportion blame or liability.

This document has been prepared based upon the evidences collected during the investigation, opinion obtained from the experts and laboratory examination of various components. 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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GLOSSARY

AFIR	Assistant Flight Instructor Rating
AFM	Aircraft Flight Manual
AME	Aircraft Maintenance Engineer
AMSL	Above Mean Sea Level
ARC	Aircraft Review Certificate
ATC	Air Traffic Control
B.A	Breathe Analyzer
CAR	Civil Aviation Requirements
CCTV	Close Circuit Television
C. G	Centre of Gravity
CPL	Commercial Pilot Licence
CRS	Certificate of Release to Service
CVR	Cockpit Voice Recorder
DGCA	Directorate General of Civil Aviation, India
ELT	Electronic Location Transmitter
FIR	Flight Instructor Rating
Ft	Feet
FTO	Flying Training Organization
FTPR	Flying Training Progress Report
GDU	Garmin Display Unit
LH	Left Hand
ICAO	International Civil Aviation Organization
IMD	Indian Meteorological Department
INMCC	Indian Mission Control Centre
IR	Instructor Rating
MET	Meteorological
METAR	Meteorological Terminal Air Report
MFD	Multifunctional Display
MTOW	Maximum Take of Weight
NLG	Nose Landing Gear
NR	Northern Region
PDR	Pilot Defect Report
PFD	Primary Flight Display
PIC	Pilot in Command
PPL	Private Pilot Licence
RT	Radio Telephony
R/W	Runway
SD	Secure Device
SPL	Student Pilot License
TPM	Training Procedure Manual
VMC	Visual Meteorological Conditions

SYNOPSIS

On 20th Sep 2021, M/s Redbird Flight Training Academy Pvt. Ltd. TECNAM P2008JC aircraft VT-RBE met with an accident at Baramati Airport, while carrying out a solo circuit and landing exercise at Baramati Airport.

On this day, 4th solo check (i.e., flying under the supervision of the instructor before releasing the trainee pilot for solo flying) and subsequently solo flying was planned for the trainee pilot. He reported for the planned training and signed the BA declaration. Instructor briefed him and did the preflight inspection.

During the solo check under the supervision of the instructor, four circuits and full stop landings were carried out uneventfully. After satisfactory assessment of the trainee's performance and credentials to undertake the solo flying, instructor released the trainee pilot for solo flying (four normal circuits approaches and full stop landings).

Aircraft took off uneventfully from runway 29, followed the circuit pattern and requested ATC for landing clearance on runway 29. Aircraft was cleared by the ATC for the same. Stable approach was followed by a smooth touchdown. There was no balloon and/or bounce as per the statement of Instructor, who was observing the landing from ATC along with the ATC Controller. Aircraft landed on the main landing gears followed by the nose landing gear and the aircraft rolled for 3-4 seconds. Then suddenly the aircraft pitched up, got airborne again with high pitch and soon started sinking with a left bank. Thereafter, the left wing touched the unpaved surface on the left side of the runway 29. Subsequently, the nose section contacted the unpaved surface. Aircraft toppled and sat down in upside down position. There was no injury. However, the aircraft was substantially damaged.

Director General, AAIB appointed Sh. Amit Kumar, Safety Investigation Officer, AAIB as Investigator – In – Charge and Capt. Ashutosh Varma as Investigator to investigate into the probable cause(s) of the accident, vide Order No. INV.11011/8/2021-AAIB dated 23rd Sep 2021 under Rule 11 (1) of Aircraft (Investigation of Accidents and Incidents), Rules 2017.

1. FACTUAL INFORMATION

1.1 HISTORY OF THE FLIGHT

On 20th Sep 2021, M/s Redbird Flight Training Academy Pvt. Ltd. (hereafter referred as RFTAPL), TECNAM P2008JC aircraft VT-RBE met with an accident at Baramati Airport, India, while carrying out a solo circuit and landing training flight at Baramati.

On the day prior to the accident, the trainee pilot was apprised by the academy about the planned solo check and subsequent solo flying (normal circuit approach and landing) schedule. Prior to this scheduled training, as per Flying Training Progress Record (FTPR), the trainee pilot had already undergone three solo checks followed by solo flying (normal circuit approach and landing). The total solo flying hours of trainee Pilot was 1:20 Hrs. This was the trainee's fourth solo check.

As per the planned schedule, trainee pilot reported for the training at the academy and signed the self-medical declaration at 0508 UTC, as per prevailing DGCA requirement for pre-flight BA test. Subsequently Instructor briefed the trainee pilot. Load and trim sheet was prepared for the solo check (dual flying) flight by the instructor. The instructor did the pre-flight inspection as per the checklist available in the aircraft. Subsequently, a walk around inspection was done by the trainee pilot. Aircraft was chokes off at 0655 UTC with 80 liters of fuel. During the solo check, the aircraft was under the supervision of the instructor to evaluate the preparedness of the trainee pilot before releasing him for solo flying. As per the flying instructor's statement, they did four circuits, approach and full stop landings. During the check, all four approaches were consistent and stabilized. Touchdown was smooth in all four landings. Aircraft was chokes on at 0740 UTC.

After satisfactory completion of solo checks, Instructor released the trainee pilot for solo flying (four circuits, approach and full stop landings). He briefed the trainee pilot for solo flying, especially about the difference which he will encounter, while flying solo due to less weight and advised him to carry out four full stop landings. Then the flying instructor proceeded to the ATC cabin to observe the trainee pilot's solo flying.

Trainee pilot taxied the aircraft to holding point 'C'. ATC cleared the aircraft to line up on runway 29. Trainee pilot after getting clearance took off uneventfully and followed the left hand circuit pattern. Then aircraft was cleared to land on runway 29. As per instructor's statement, take off was satisfactory, whole circuit was correct,

approach was stabilized. As per ATC statement all necessary RT messages /communication were passed by the trainee pilot during the solo circuit approach and landing. As per instructor statement, during solo circuit approach and landing training flights, trainee pilots are prohibited from carrying out touch and go and all landings are required to be full stop landings.

Based on the account of the eyewitness, the touchdown was smooth. Aircraft landed on the main landing gears followed by the nose landing gear and the aircraft after rolling for 3-4 seconds got airborne again with a high pitch attitude, as per trainee pilot's recollection, he felt that he had ballooned and therefore initiated a Go around after touchdown. Meanwhile, the Instructor watching the landing from the ATC cabin also instructed the ATC personnel to ask the trainee pilot to initiate a Go around. ATC controller advised the same on the RT. However, the aircraft could not maintain the altitude for long and started sinking with a left wing drop. Consequently, aircraft turned towards the left. Aircraft's LH wing tip first hit the unpaved surface on the left side of runway 29, then the nose section hit the unpaved surface, while the propeller's blades were still rotating. Aircraft rolled and finally the aircraft came to rest in the upside down position. During the accident no distress signal was passed by the trainee pilot. Due to impact, the ELT got activated.

ATC personnel switched ON the emergency siren and informed the Dy. CFI over the telephone. Instructor and two ATC personnel's watching the aircraft from inside the ATC cabin rushed to the accident site.

Aircraft was in the upside down position and the trainee pilot was hanging with his harness. Trainee pilot was rescued immediately from the aircraft without any injury. There was no fire.

1.2 INJURIES TO PERSONS

Injuries	Crew	Passengers	Others
Fatal	NIL	NIL	NIL
Serious	NIL	NIL	NIL
Minor/ None	01	NIL	NIL

1.3 DAMAGE TO AIRCRAFT

Aircraft was substantially damaged during the accident. The aircraft suffered damage mainly to its fuselage, wings, engine compartment & firewall, nose landing

gear assembly, vertical stabilizer, propeller and cockpit. Details of the aircraft damages are given below:

1. Right Wing



Figure 1: RH Wing

Wing leading edge was found twisted inward and downward from tip of wing to upper strut attachment. Distance measured from the wing tip to damage area on the wing was 5 Feet 8 Inches. Wing skin was found ripped out at root and at twisted portion. An approx.12 inches long cut mark was also found on the RH wing. Wing-to-fuselage attachment skin was found completely wrinkled. Wing tip was found completely broken.

Aileron was found damaged at inboard root side attachment. Flap was also found damaged at the tip on root side of wing attachment.

2. Left Wing





Figure 2: LH Wing

LH wing's front and aft spars were found completely damaged. Dents were found on wings leading edge. Wing skin was also found ripped out at a distance of 01 feet 10-inch from the root. A cut mark of approx. 11 inch long was found on wing skin of the leading edge at a distance of 3 feet 6 inch from wing root.

Wing tip skin was also damaged. Wing tip was found completely broken and twisted outward and upward. Navigation and Strobe lights was also found damaged.

Aileron was found damaged on inboard root side attachment of aileron spar to wing attachment point. Flap was also found bent at a distance of 2feet 7 inches and completely damaged at tip of the flap.

3. Fuselage section



Figure 3: Fuselage section

Fuselags skin of the aircraft was found damaged from nose to front of cabin campartment, including engine cowlings. Windshield was also found completely broken.

4. Nose Landing Gear & propeller



Figure 4: NLG Section

Nose section of the aircraft was found substantially damaged. Nose landing gear leg was found damaged due to ground impact. Attachment of NLG was found broken. NLG Oleo strut was also found broken.

Firewall was found completely broken at 2 feet 6 inches from the bottom of the cabin and was also found bent towards the aircraft cabin compartment. Propeller was found completely damaged and scattered.

5. Vertical Stabilizer



Figure 5: Vertical Stabilizer

The vertical stabilizer tip was found completely damaged and approx. 1 ' 11" long area was ruptured.

6. Cockpit



Figure 6: Cockpit

Inside the cockpit display units, Instrument panels and Radio panels were found damaged and found shifted from their original place.

1.4 OTHER DAMAGE

NIL

1.5 PERSONNEL INFORMATION

PILOT – IN – COMMAND

Nationality	: Indian
Age	: 29 Years
License	: SPL
Date of Issue	: 21/02/2021
Valid up to	: 20/02/2026
Category	: Aeroplane
Date of Medical Examination	: 04/02/2021
Medical Exam Valid up to	: 03/02/2023
Date of issue FRTOL License	: 23/06/2021

FRTO License Valid up to	: 22/06/2031
Endorsements on the License	: Tecnam P2008JC
Last Flown on type	: 16/09/2021
Total flying experience	: 30:05 Hrs.
Total flying experience during last 180 days	: 19:30 Hrs.
Total flying experience during last 90 days	: 19:30 Hrs.
Total flying experience during last 30days	: 12:30 Hrs.
Total flying experience during last 07days	: 04:20 Hrs.
Total flying experience during last 24 Hrs	: 00:00 Hrs.
Rest period before flight	: 72 Hrs.

The trainee pilot is perusing PPL flying course under the RFTAPL. Student Pilot License (SPL) was issued on 21.02.2021 by RFTAPL and he started flying from the same day. Trainee pilot was released for 1st, 2nd and 3rd solo flying on 09th Sep, 2021, 13th Sep, 2021 and 14th Sep, 2021 respectively. During previous solo checks and subsequent solo flying, trainee pilot's performance was satisfactory as per FTFR. Trainee pilot had total of 01.20 Hrs of Solo flying experience prior to the accident.

1.6 AIRCRAFT INFORMATION

1.6.1 AIRCRAFT DESCRIPTION

Tecnam P2008 JC is a single-engine two-seater aircraft with a strut braced high wing and fixed landing gear. This aircraft is fitted with ROTAX 912 S2 Engine. The Tecnam P2008 JC fuselage is mainly made up of carbon fibers composite materials.

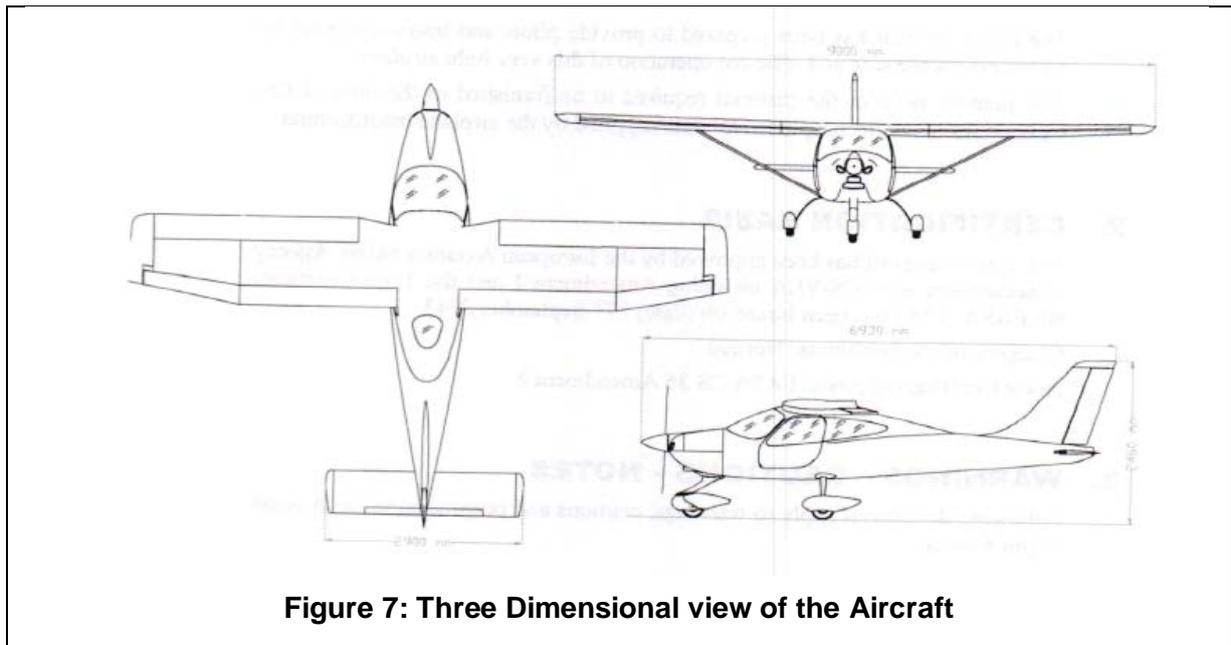


Figure 7: Three Dimensional view of the Aircraft

Wing:

Wing Span	:	9.00 m (29.5 ft)
Wing Area	:	12.16 m ²
Aspect Ratio	:	6.7
Taper Ratio	:	0.8
Wing Chord	:	1.373 m (4.5ft)

Fuselage:

Overall length	:	6.93 m (22.9 ft)
Overall width	:	1.20 m (3.9 ft)
Overall height	:	2.67 m (8.8 ft)

Empennage:

Stabilator span	:	2.90 m (9.51 ft)
Stabilator area	:	2.03 m ² (21.8 ft ²)
Vertical tail area	:	1.06 m ² (11.4 ft ²)

Landing Gear:

Wheel Track	:	1.8 m (5.9 ft)
Wheel base	:	1.94 m (6.4 ft)
Main Gear tire	:	5.00-5
Nose Gear tire	:	5.00-5

Details of Engine:

Manufacturer	:	Bombardier-Rotax GmbH
Model	:	ROTAX 912 S2
Type	:	4 stroke, horizontally-opposed 4 cylinder mixed air and water cooled, twin electronic ignition, forced lubrication.
Maximum rating	:	98.6hp (73.5kw) @ 5800 rpm/min (2388 rpm/min. prop) Gear reduction ratio – 2.4286:1
Max. oil consumption	:	Max :0.1 Litres/hour

Propeller:

Manufacturer	:	Haffman Propellers
Model	:	HO17GHM A 174 177C
No of blades	:	2

Diameter	:	1740mm
Type	:	Fixed patch

Fuel:

2 Tank	:	62 litres each one (16.38 US gallons)
Maximum Capacity	:	124 Litres (32.76 US gallons)
Maximum Usable Fuel	:	120 Litres (32 US gallons)
Approved Fuel	:	MOGAS ASTM D4814 (min RON 95/AKI91)

Flight Controls:

Aircraft flight controls are operated through conventional stick and rudder pedals. Longitudinal controls acts through a system of push-rods and is equipped with a trim tab. A cable controls circuit is confined within the cabin and it is connected to a pair of push-pull rod systems positioned in each main wing which controls ailerons differentially. Aileron trimming is carried out on ground through a small tab positioned on the left aileron.

Flaps are extended via an electric servo actuator controlled by a switch on the instrument panel. Flaps act in continuous mode; the indicator displays three marking relate 0, takeoff (T/O) and landing (FULL) positions. A breaker position on the right side of instrument panel protects the electric circuit.

Longitudinal trim is performed by the trim tab located on the Stabilator through an electric actuator controlled by the pilot or co-pilot by a switch located on the control switch. An analogue trim indicator provides information about the surface position. In case of a trim control runaway a trim disconnect switch is available on the instrument panel.

Avionics:

The avionic system installed on Tecnam P2008 JC is based on MD302, which provides primary flight information. It is located in the centre of the instrument panel

Two Garmin G3X Touch integrated avionic suite (GDU 460 display units) were installed on the aircraft VT-RBE. One was used as a PFD and other one was used as MFD. It provides flight and engine related data intended for the pilot's situational awareness only.



Figure 8: Garmin G3X (display units)

G3X also embodies a GPS WAAs receiver whose information, intended for situational awareness only, are presented on RH display moving map. SD card installed inside this unit can provide flight data such as altitude, airspeed, pitch and roll etc. This flight data is very useful for information for a flying training Organization.

Extract from Garmin G3XManual

8.8 FLIGHT DATA LOGGING USING THE SD CARD

The flight data logging feature automatically stores flight and engine data to an SD card. Data is recorded to the SD card every second. A data file is created each time the system is powered on with an SD card inserted, or each time an SD card is inserted after starting the system. A 2 GB SD card can store over 1,000 hours of flight data or up to 1,000 files (whichever comes first). The data files stored on the SD card have an extension of .csv. This file format can be opened using a spread sheet application. Garmin recommends using a 8 GB SanDisk® or Toshiba® SD card.

Data Logging must be enabled in Configuration Mode.

Data stored inside the Garmin Display units is very useful in analyzing the student's solo performance. It can be utilized during the ground classes to demonstrate the actual tracks and flight related issues. It is also a very useful tool for investigation of an aircraft occurrence. Especially for those aircraft which are not equipped with CVR or DFDR, flight data monitoring and storing units.

Although all TECNAMP2008JC aircraft operated M/s RFTAPL are equipped with Garmin G3X display units, no SD card was used by the RFTAPL.

1.6.2 AIRCRAFT SPECIFIC (VT-RBE)

Aircraft Model	: TECNAM P2008JC
Aircraft S. No.	: 1155
Year of Manufacturer	: 2019
Name of Owner	: Redbird Flight Training Academy Pvt. Ltd.
C of R	: 5206/2
C of A	: 7309
Category	: Normal
C of A Validity	: Valid
A R C issued on	: 23/06/2021
ARC valid up to	: 24/06/2022
Aircraft Empty Weight	: 437.20 Kg
Maximum Takeoff weight	: 650 kg
Date of Aircraft weighment	: 24/09/2019
Max Usable Fuel	: 120 litres
Max Payload with full fuel	: 40.40 Kg
Empty Weight C.G	: 1.847 inches aft of datum
Total Aircraft Hours	: 2743:30 Hours T.S.N
Last major inspection	: 15/09/2021
List of Repairs carried out after last major inspection till date of accident	: No repairs carried out.
Engine Type	: 912 S2-01
Date of Manufacture	: 29/03/2021
Engine Sl. No.	: 9139758
Last major inspection	: 15/09/2021
List of Repairs carried out after last major inspection till date of accident	: No repairs carried out.
Total Engine Hours	: 746:50 Hours T.S.N
Propellers Hours	: 746:50 Hours
Aero mobile License details	: A-161/001-RLO(NR)

The Aircraft is registered in "Normal" category & Subdivision - "Passenger Aircraft". The C of A remains valid subject to validity of Airworthiness Review Certificate. Last ARC was issued at 2073:40 Hrs on 23rd June 2021, by DGCA, Western Regional Office, at Mumbai. The Aircraft was holding a valid Aero Mobile

License No. A-161/001-RLO (NR) at the time of the accident. The Aero Mobile license was Valid till 30th April 2026.

The aircraft was operated for flying training purpose only under Flying Training Organization Approval No. 1/2020 issued on 23.07.2020 and valid upto 22.07.2025.

The aircraft was last weighed on 24th Sep 2019 at Capua, Italy and the same was duly approved by the office of Director of Airworthiness, DGCA (WR), Mumbai.

Aircraft had logged 2743:30 hours till the date of accident. Last scheduled inspection carried out on the aircraft was 50 Hours approved inspection at 2743:30Hrs airframe hours on 20th Sep 2021. The last CRS was issued on 20th Sep 2021. Pre-flight inspection was carried out by the AME (Aircraft Maintenance Engineer) before the first flight on the day of the accident. Prior to the accident flight, the aircraft had flown for 04:40 Hrs. with 02 landings on the day of the accident (excluding 04 circuit and landing done by the trainee pilot under the supervision of Instructor) and no snag was recorded.

All concerned Airworthiness Directives and mandatory Service Bulletins on this aircraft and its engines were complied with as on date of event. No DGCA Mandatory Modification was issued till the date of accident.

The aircraft does not have any history of accident or incident. Scrutiny of the technical log book and Pilot Defect Report (PDR) register revealed that there was no snag pending on the aircraft prior to the accident flight. The last PDR entry made in PDR register was of 27th Jan 2021. The corresponding rectification was done on 30th Jan 2021.

1.7 METEOROLOGICAL INFORMATION

At Baramati Airport there is no IMD recognized MET office. The nearest MET office is in Pune. However, M/S Redbird Flight Training Academy Pvt. Ltd. had installed standalone weather equipment for monitoring the weather. However, these were installed recently and RFTAPL is utilizing the weather information as a secondary source. At RFTAPL, pilots are obtaining weather information prior to take off from the IMD website.

The weather Minima for solo flying as per RFTAPL Flying Order No-14 dated Jan 2020 is quoted below:

Weather Minima for solo flying will be VMC:

- Visibility* - 5 Km
- Cloud base* - 1500ft
- Cross wind component* - As per aircraft manual

As per TECNAM P2008 JC, Aircraft Flight Manual, maximum demonstrated crosswind is 15kts.



Figure 9: Weather equipment at RFTAPL

METAR issued between 0730 UTC to 0930 UTC at Pune Airport.

Time in UTC	Wind Dir	Wind Speed (KT)	Vis (Km)	Clouds	Temp (°C)	Dew Point (°C)	QNH (hPa)	TREND
0730	280	10	6	Few 020 SCT 030 BKN 100	29	22	1012	TEMPO – RA=
0800	270	10	6	SCT 020 SCT 030 BKN 090	29	22	1012	TEMPO – RA=
0830	300	08	6	SCT 020 SCT030 BKN 100	28	22	1011	TEMPO – RA=
0900	290	11	6	SCT 020 SCT030 BKN 090	29	22	1011	TEMPO – RA=
0930	280	08	6	SCT 020 SCT 030 BKN100	29	23	1010	TEMPO – RA=

As per above METAR weather was within VMC operating limits.

1.8 AIDS TO NAVIGATION

There are no radio navigation aids available at Baramati Airport. The Baramati Airport has got only one runway and is a “Visual Approach Runway” which is equipped with a “Wind Sock” installed near the beginning of runway29.

1.9 COMMUNICATIONS

There was always a positive two way communication between the aircraft and the ATC personnel on RT at 129.25 MHz frequency.

1.10 AERODROME INFORMATION

The Baramati Airport is located at Baramati, in Pune district Maharashtra, India. It is an uncontrolled Airfield, managed by Baramati Airport Limited (BAL). M/s Redbird Flight Training Academy Private Limited is using the Airport facility for flying training and maintenance related activity under the license granted by BAL. License is valid up to 1st December 2025. It has a 7710ft(2350m) asphalt runway.

Airport Co-ordinates: - Lat: 18°13'35.84" N, Long: 74°58'18" E.

Elevation: 1996 AMSL feet.

The orientation of the runway is 11/29. The Air Traffic Control (ATC) is manned by CPL holders during normal working hours. Frequency used for VHF communication is 129.25 MHz.

1.11 FLIGHT RECORDERS

As per the prevailing DGCA Civil Aviation Requirements, Cockpit Voice Recorder (CVR) and Digital Flight Data Recorder (DFDR) were not required to be equipped on the aircraft VT-RBE. No Cockpit Voice Recorder (CVR) or Digital Flight Data Recorder (DFDR) was available on the aircraft VT-RBE.

1.12 WRECKAGE AND IMPACT INFORMATION

After touchdown the aircraft rolled for 3-4 seconds before getting airborne. The aircraft pitch was high and altitude started increasing. After few seconds aircraft was started sinking with LH wing drop. Aircraft then turned left. Aircraft's LH wing tip first hit the unpaved surface on the left side of the runway 29 and dragged for few feet. Then the nose section hit the ground, at that moment propeller's blades were rotating at high speed. Consequently, wooden propeller blades hit the unpaved surface and a major portion of the blades were scattered in pieces. Aircraft toppled and RH wing hit the unpaved surface before coming to rest in the upside down position. Distance between the LH wing tip to runway centre line was 123ft and 4 inches.



Figure 10: Aircraft final resting position

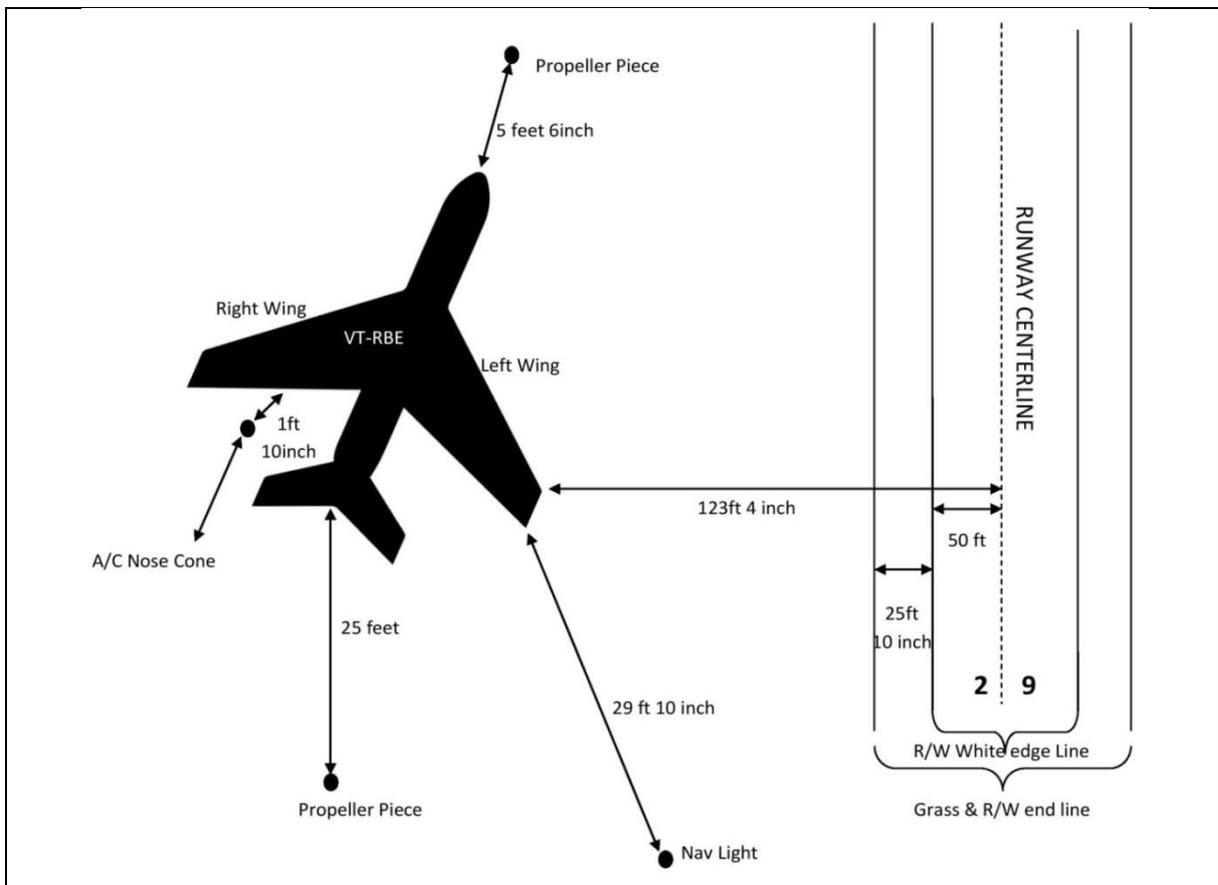


Figure 11: Aircraft (upside down) wreckage distribution.

Aircraft wreckage was mainly confined to one place. However, few parts were scattered during the accident. Few Propeller pieces were found 5' 6" ahead of its nose section and few pieces were found 25' away from the horizontal stabilizer. LH Navigation light was found 29' 10" behind the LH wing trailing edge tip. Aircraft nose cone was found 1'10" behind the trailing edge of RH wing.

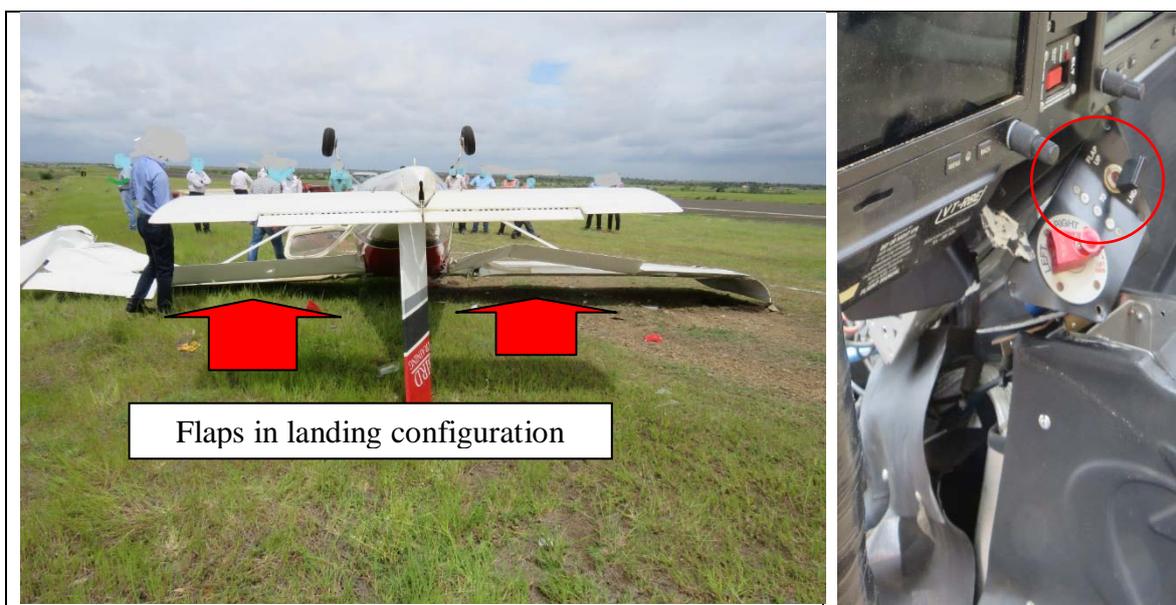


Figure 12: Flap position

During visit to the accident site, it was found that Flaps were in the landing configuration and same was corroborated by the Flap selector in the landing position as observed in the cockpit (Refer figure above). As per trainee pilot, while carrying out the Go Around, he did not change the flaps configuration to Take Off.

1.13 MEDICAL AND PATHOLOGICAL INFORMATION

The crew had signed a BA declaration for pre-flight medical Breath Analyzer (BA) test at Baramati Airport. Post-accident, trainee pilot had undergone BA test at Baramati. The test result was negative i.e. trainee pilot was not under the influence of alcohol or psychoactive substance.

1.14 FIRE

There was no fire pre or post accident.

1.15 SURVIVAL ASPECTS

As there was no injury, hence it may be concluded that this accident was a survival accident.

1.16 TESTS AND RESEARCH

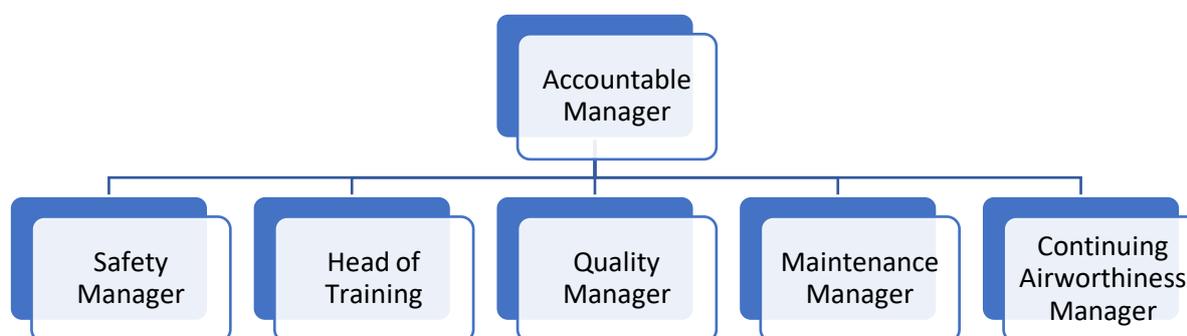
Fuel sample collected from the aircraft VT-RBE was sent to DGCA's fuel laboratory at New Delhi to determine the samples specification. As per Lab test report, the fuel sample passed the specification test.

1.17 ORGANISATIONAL AND MANAGEMENT INFORMATION

1.17.1 RFTAPL

M/s RFTAPL is a DGCA approved flying training organization situated at Baramati, Pune, Maharashtra. DGCA FTO approval No. is 01/2020, issued on 23.07.2020 and approval is valid up to 22.07.2025. Scope of approval is aero planes-PPL, CPL, IR, AFIR, FIR and extension of aircraft ratings single engine / multi engine. As on date of accident the organization was having two types of single engine aircraft and one multi engine aircraft in its fleet. Aircraft fleet consists of one Cessna 172P, five Tecnam P2008JC and one multi engine Tecnam P2006Taircraft.

Organization Chart:



Accountable Manager is responsible for management and operation of Organization related activities. Safety Manager, Quality Manager, Head of Training, Maintenance Manager and Continuing Airworthiness Manager extend their support to the Accountable Manager.

1.17.2 Procedures for solo checks are laid down in the RFTAPL approved TPM and the same is quoted below:

Procedures under which the trainee pilots can be sent on their First solo and subsequent solos: First & subsequent Solos

- a) Proficient in Circuit Approach & Landing.*
- b) Ability to analyze mistakes committed and corrections thereof.*
- c) Thorough knowledge of recovery from bounce, balloon & PIO & emergencies in circuit.*

Instructor will make sure that all essential exercises are covered before releasing first, second, third & subsequent solos.

1.17.3 Preparation of load and trim sheet prior to every flight to ensure the CG of the aircraft is laid down in the M/s RFTAPL approved TPM and Flying Order No. 3.8 and the same are quoted below:

TPM Para 5.15, states, *“Procedures to ensure Centre of Gravity of training aircraft: Prior to every flight, the CG range of the aircraft is to be determined by calculating the moments. This has to be marked in the CG diagram given in load and trim sheet. All pilots are to ensure that the CG is within the permissible range. After the sortie the load and trim sheet to be handed over as part of documentation with CFI for retention”.*

TPM Para 9.3 states, *“Loading (load sheets, mass, balance, limitations): Prior to every flight, the CG range of the aircraft is to be determined by calculating the moments. This has to be marked in the load and trim sheet. All pilots are to ensure that the CG is maintained within the permissible range”.*

Flying Order No-3.8 dated Jan 2020 - *“All pilots should be aware of C of G limits and maximum weight limits of the aircraft flown. Weight and balance calculations are to be done before every flight. The charts are printed on back page of flight coupons. Above coupons are to be submitted for every sortie. In case limits are exceeded, PIC has to remove extra loads for safety of flight”.*

1.17.4 Touch & Go procedure in TPM.

As per approved TPM, Chapter 5, Touch & Go (assisted) are required to be carried out at pre solo stage during the training. However as per RFTAPL management same was not practiced by the Students at RFTAPL, which in contravention to the approved syllabus in the TPM. Extract of the TPM is given below.

01:00	D8	CL	07:15			07:15
	Know: Normal Circuits & Landings, RT calls in Circuit. D & P: Normal Circuits & Landings, Touch & Go, RT, Safe Stop & Vacate RWY after Landing. Asst: RT, Traffic Separation, Approach, Landings, Touch & Go. Unasst: Checks, Start-up, Taxi, Line-Up, Take Off, Shutdown.					
01:00	D9	CL	08:15			08:15
	Know: Trainee to know- Important Landmarks in Circuits of both the RWYs, Use of PAPI. Procedure - XW, HW & TW Landing Technique & Precautions, Normal CCT, Extended Downwind, Runway Change Procedure D & P: Wind Corrections, Extended D/W. Asst: Traffic Separation, Approach, Landing, Touch & Go. Unasst: Checks, Start-up, Taxi, Line-Up, Take Off, Normal Circuits, RT, Shutdown.					
01:00	D10	CL	09:15			09:15
	Know: Trainee to know- Effect of Weight & Density Altitude in Take-off & Landing, Traffic Separation in CCT, Safety Precautions close to ground/Rwy. Procedure- Recovery from bounce & balloon, Recovery from Pilot Induced Oscillation. Emergency- EFATO D & P: Flapless CCT & Ldg, Traffic Separation, Go-Around, Recovery from Bounce/Balloon/PIO, EFATO. Asst: Approach, Landing, Touch & Go. Unasst: Checks, Start-up, Taxi, Line-Up, Take Off, Normal Circuits, RT, EXT D/W, Safe Stop & Vacate RWY after landing, Shutdown.					
01:00	D11	CL	10:15			10:15
00:45	D16	CL	14:15			14:15
	Unasst: Normal, Partial Flap CCTs & LDGs, RT, Traffic Separation, APP & LDG without PAPI, LDGs in Strong HW, Go-Around, Recovery from Bounce/Balloon/PIO, EFATO. D & P: XW Landing Technique					
00:45	D17	CL	15:00			15:00
	Unasst: Normal, Partial Flap CCTs & LDGs, RT, Traffic Separation, APP & LDG without PAPI, LDGs in Strong HW/XW, Go-Around, Recovery from Bounce/Balloon/PIO, EFATO.					
00:45	D18	First Solo Check To be flown with CI/CFI/Dy; CFI/PI	15:45			15:45
	Know: Trainee to know- Procedure- X-Wind Landing, Action in case of Low/High Balloon, Low/High Bounce & PIO. Emergency- Engine Failure after T/O & on D/W. Trainee should be proficient in landing in 5 kts X-Wind & 10 kts head wind. Recognize and Manage Threats and Errors: Trainee should be able to take safe decisions for Approach Management, Traffic Management and Errors in Landings <ul style="list-style-type: none"> • Trainee to carry out ONE normal Circuit Approach and Landing 					
00:15	F9	First Solo (FDR)	15:45	00:15		16:00
01:00	F1	CL/ GF/ Solo Check	16:45	00:15		17:00
00:45	F2	CL/ GF/ Solo Check	17:30	00:15		17:45
00:45	F3	CL/ GF/ Solo Check	18:15	00:15		18:30
00:45	F4	CL/ GF/ Solo Check	19:00	00:15		19:15
00:45	D20	CL Second Solo	19:45	00:15		20:00

Figure 13: Extract from TPM

1.18 ADDITIONAL INFORMATION

1.18.1 DGCA FLYING TRAINING ADVISORY CIRCULAR 1 OF 2013

DGCA has issued a Flying Training Advisory Circular 1 of 2013 dated 28th June 2013 for Installation of real time camera in Flying Training Organization. Objective of the circular is to enable better surveillance of flying activities conducted in FTOs so as to help in controlling the false and fraudulent log book entries. The installation was also expected to help the students/instructor in analysis of the flying exercise. All FTOs were directed to install cameras to provide real time view through internet.

M/s Redbird Flight Training Academy Pvt. Ltd had not installed CCTVs in the academy as required by the DGCA Flying Training Advisory Circular 1 of 2013 dated 28th June 2013.

1.18.2 Preparation of load and trim sheet prior to every flight to ensure the CG of the aircraft is laid down in the DGCA CAR Sec 2 Series X part II and the same are quoted below:

DGCA CAR Sec 2 Series X part II Para 9.4 states, "Every operator including scheduled, non-scheduled, State Government and private aircraft operator shall prepare load and trim sheet for aircraft where the manufacturer has provided necessary documentation for the purpose. The load and trim sheet shall indicate the composition and the distribution of the total load carried on board the aircraft as well as the calculated C.G. position for "take-off and landing" configurations before the

commencement of the flight. Such load sheets shall be prepared and signed by the Pilot-in-Command or persons duly trained in accordance with CAR Section 8 Series 'D' Part I and responsible for supervising the loading of aircraft. In case the load and trim sheet is prepared by a person other than the Pilot-in-Command, the same shall be submitted to the Pilot for his scrutiny and signatures before the commencement of the flight. One copy of the load sheet shall be carried on board the aircraft and one copy shall be retained by the operator for record purposes for a period of at least four months from the date of issue". Further as per DGCA CAR Section 2 Series X Part VII Para 2.1, it is mandatory to carry valid load and trim sheet during each flight.

1.18.3 AFM actions in case of balked landing

Procedure/actions for carrying out balked landing is documented in the Tecnam P2008JC AFM. Same is quoted below:

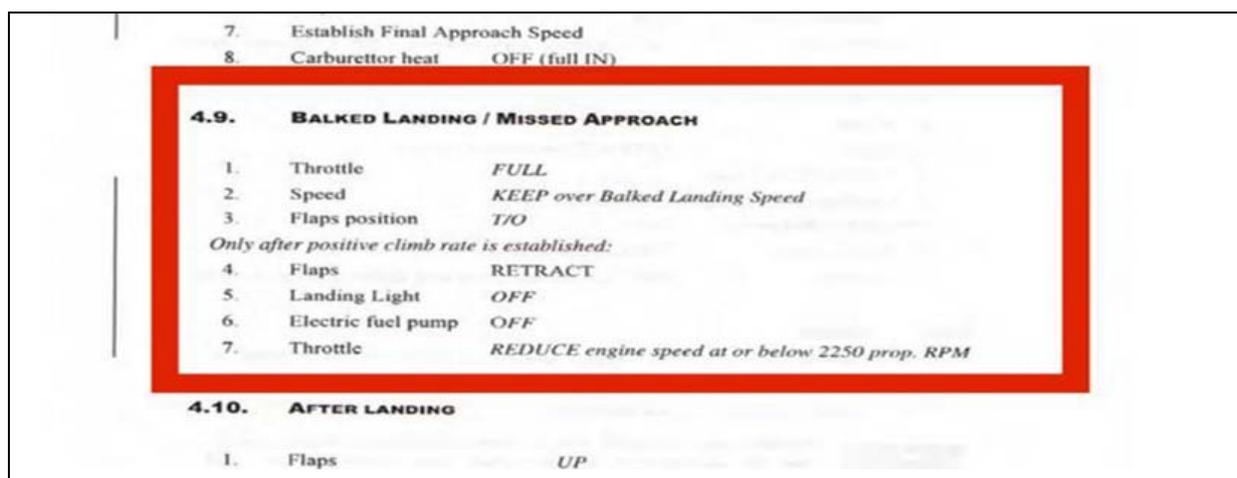


Figure 14: Extract from AFM for Balked Landing

However, the pre-solo training syllabus does not include any un-assisted balked landing exercise under supervision during dual flight, in which the trainee is required to practice unassisted balked landing procedure specified as given above. It is also confirmed by the management the same is not practiced by trainees during pre-solo training stage at RFTAPL.

1.19 USEFUL OR EFFECTIVE INVESTIGATION TECHNIQUES

Nil.

2 ANALYSIS

2.1 GENERAL

At the time of the accident, aircraft's C of R, C of A, ARC and Aero Mobile License were valid and current as per applicable DGCA CAR. Aircraft had logged 2743:30 hours till the date of accident. During the nose section impact with ground, propeller was in rotation which indicates engine was delivering adequate power. Further trainee pilot did not pass any distress signal to ATC. During interview he also stated that there was no abnormality on the aircraft.

All concerned Airworthiness Directives, mandatory Service Bulletins, and DGCA Mandatory Modifications on this aircraft and its engines were complied with as on date of event. Aircraft was airworthy as per current aircraft records.

Load and trim sheet for solo check (dual flying) was prepared by the instructor. However, as per organizational practice, the load and trim sheet for solo flying sortie (immediately after solo check) was not prepared by the trainee pilot. During the investigation a rough calculation was done to understand the C.G of the aircraft and the same was found within the OEM's prescribed limits.

In view of the above, it is concluded that the aircraft serviceability was not a contributory factor to the accident.

As per METAR obtained from Pune, visibility was 6km and wind was below 10 knots. Overall the weather during the accident was within the VMC limits for solo flying. Hence, it is concluded that the weather was not a contributory factor to the accident.

Trainee pilot was appropriately licensed as per prevailing DGCA regulations and was qualified to undertake the solo flight.

2.2 NON ADHERENCE TO DGCA CAR AND RFTAPL'S APPROVED TPM.

2.2.1 The DGCA CAR and approved Organization's TPM and Flying Order mandates for preparation of load and trim sheet for each flight. Load and trim sheet for solo check (dual flying) was prepared by the instructor. However, the load and trim sheet for solo flying sortie (immediately after solo check) was not prepared by the trainee pilot. The load and trim sheet kept on board was of solo check (dual flying). Although non availability load and trim sheet for the solo flight was not a contributory factor, this was a non adherence to DGCA CAR Section 2 Series X part II & part VI and RFTAPL's approved TPM.

2.2.2 As per RFTAPL's approved TPM, trainee pilot needs to practice assisted Touch & Go as an essential exercise at pre solo stage. However, as per RFTAPL's management, the same exercise was not being carried out during the pre-solo training. This is a non adherence to DGCA's approved flying training syllabus documented in the TPM.

2.3 GAP BETWEEN THE AFM AND TPM.

The AFM has a well-defined Balked landing procedure, which is not a part of pre-solo training exercises and is not practiced by the trainee either in assisted or unassisted mode. Even a demonstration exercise is not a part of the approved training syllabus in TPM.

2.4 PILOT HANDLING & CIRCUMSTANCES LEADING TO THE ACCIDENT

Post solo check, instructor released the trainee pilot for four solo circuits, approach and full stop landings. During solo flying (normal circuits approach and landing), trainee pilots are prohibited to carry out touch and go profile. Therefore, during solo flying after each landing trainee pilot had to obtain necessary clearance before initiating subsequent take-off. In the 4th solo flight, the trainee took off uneventfully and followed the left-hand circuit pattern as shown below.

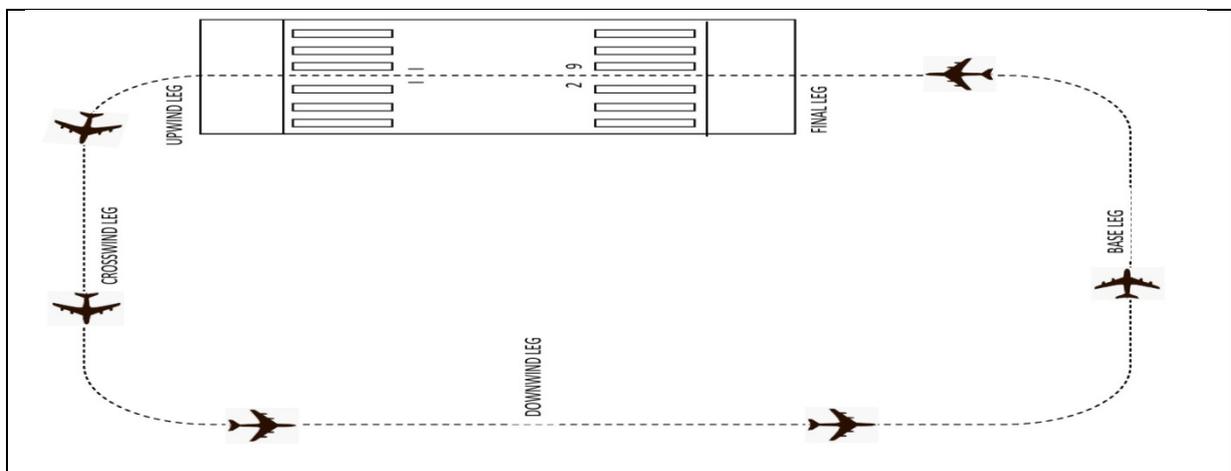


Figure15: Circuit pattern followed by the trainee Pilot

He exchanged all necessary RT calls with the ATC. Aircraft was stable during approach and landing. The touchdown was smooth. Aircraft landed on the main landing gears followed by the nose landing gear and the aircraft rolled with nose wheel on the ground, for 3-4 seconds. Instead of carrying out a full stop landing, trainee pilot thereafter initiated a balked landing procedure and increased the power

from Idle to Take-off. However, he did not change the Flap setting from landing configuration to Take-off configuration, as required in the balked landing procedure specified in the AFM. Consequently, on rotation the aircraft pitched up to an uncontrollable high pitch attitude and stalled with the left-wing dropping first. Aircraft then toppled and finally came to rest in an upside-down position. Whether his speed was above the balked landing speed before rotation or not, could not be confirmed as SD chip of Garmin system with recorded flight data was not available.

3 CONCLUSIONS

3.1 FINDINGS

1. Aircraft was maintained in accordance with the approved maintenance program and there was no deferred maintenance on the aircraft or its engine before undertaking the accident flight.
2. Trainee pilot was holding a valid SPL and was meeting all qualification requirements for operating the flight and was current on licenses and ratings.
3. Weather during the accident was within the VMC limits for solo flying.
4. Organization had a valid approval for carrying out flying training which was valid up to 22nd July 2025.
5. M/s Redbird Flight Training Academy Pvt. Ltd. was found in non compliance of DGCA's Flying Training Advisory Circular 1 of 2013.
6. Non compliance to DGCA's CAR Sec 2 Series X part II Para 9.4 and CAR Sec 2 Series X part VII Para 2.1 for preparation of the valid load and trim sheet for each flight and carrying the same on board. Load and trim sheet was not prepared for solo flying training.
7. The ELT was activated and distress signal was first detected at 0830 UTC by the INMCC.
8. In the absence of CCTV footage or recording of VHF communication or SD card for Garmin G3X system at Baramati ATC, the exact reason and chronology of events could not be corroborated with the statements of the witnesses. Further reason for aircraft getting airborne again after a smooth landing could not be ascertained. However, the sequence of events after getting airborne again and wreckage analysis clearly indicated that the trainee pilot had not followed the correct balked landing procedure.

9. Apart from statements from persons inside the ATC cabin and the trainee pilot, there is no evidence of exact RT communication. Due to unavailability of recordings, investigation team could also not recreate exact timelines of various events.
10. There is a gap between AFM and TPM i.e., balked landing is not a part of training syllabus as per TPM.

3.2 PROBABLE CAUSE OF THE ACCIDENT

The probable cause of this accident is attributed to the inappropriate aircraft handling after touchdown and incorrect execution of "Balked Landing" procedure, as specified in the AFM.

The reason for aircraft getting airborne again after a smooth landing could not be ascertained during the investigation.

4 SAFETY RECOMMENDATIONS

4.1 It is recommended that DGCA should mandate that all approved FTOs should have infrastructure for recording RT communication with necessary storage and retrieval facility.

4.2 It is recommended that DGCA should ensure the installation of CCTV camera especially to monitor the flying activities and storage of the same at least for one month or more or work out the acceptable means of compliance of its Flying Training Advisory Circular 1 of 2013.

4.3 It is recommended that DGCA should issue a circular for mandatory installation of SD cards and storage & analysis of data by the FTOs for all aircraft equipped with Garmin display units. The same can be used for monitoring purposes by the training Organization and should be monitored by DGCA officers during surveillance/Audit/ inspections of all FTOs.

4.4 It is recommended that DGCA should ensure the compliance of CAR Section 2 Series X part II Para 9.4 and CAR Section 2 Series X part VII Para 2.1 for preparation of load and trim sheet and carriage on board by M/s Redbird Flight Training Academy Pvt. Ltd and all other FTOs.

4.5 It is recommended that DGCA should re-evaluate the Training Syllabus of the FTOs, in the light of this accident to include the training of balked landing (assisted/unassisted) at pre solo stage.

4.6 It is recommended that M/s Redbird Flight Training Academy Pvt. Ltd should impart pre-solo training as per approved TPM syllabus and carry out additional ground training of all trainee pilots covering Go Around/balked landing procedure.



Capt Ashutosh Varma
Investigator



Amit Kumar
Investigation-In-Charge