FINAL INVESTIGATION REPORT ON ACCIDENT TO

M/s WINGS AVIATION PVT. LTD.,

CESSNA 172S AIRCRAFT, VT-RGF ON 06-10-2019

AT SULTANPUR VILLAGE, TELANGANA.

R S Passi
Investigator -In- charge

K Ramachandran
Investigator

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/serious incident shall be the prevention of accidents and incidents and not to apportion blame or liability. The investigation conducted in accordance with the provisions of the 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.

INDEX

GLOSSARY

AAIB	Aircraft Accident Investigation Bureau, India
AFI	Assistant Flight Instructor
AMSL	Above Mean Sea Level
AME	Aircraft Maintenance Engineer
ARC	Airworthiness Review Certificate
ASR	Airport Surveillance Radar
ATC	Air Traffic Control
ATCO	Air Traffic Control Officer
AUW	All Up Weight
BCAS	Bureau of Civil Aviation Security
C of A	Certificate of Airworthiness
C of R	Certificate of Registration
CAR	Civil Aviation Requirements
CFI	Chief Flight Instructor
CG	Centre of Gravity
CISF	Central Industrial Security Force
CPL	Commercial Pilot License
CVR	Cockpit Voice Recorder
DFDR	Digital Flight data Recorder
DGCA	Directorate General of Civil Aviation
Dy.CFI	Deputy Chief Flight Instructor
GPS	Global Positioning System
hrs	Hours
ICAO	International Civil Aviation Organization
ILS	Instrument Landing System
LLZ	Localizer
MEL	Minimum Equipment List
MET	Meteorological
MLG	Main Landing Gear
MTOW	Maximum Take Off Weight
NDB	Non-Directional Beacon
NLG	Nose Landing Gear
NM	Nautical Miles
POB	Person on Board
RPS	Radar Positioning System
VFR	Visual Flight Rules
VMC	Visual Meteorological Conditions
VOR	VHF Omnidirectional Range
UTC	Coordinated Universal Time

FINAL INVESTIGATION REPORT ON ACCIDENT TO

M/s WINGS AVIATION PVT. LTD., CESSNA 172S AIRCRAFT, VT-RGF

ON 06-10-2019 AT SULTANPUR VILLAGE, TELANGANA.

1.	Aircraft	Type	Cessna 172 S
		Nationality	Indian
		Registration	VT-RGF
2.	Owner and Operator		Wings Aviation Pvt. Ltd.
3.	Pilot – in –Command		Student Pilot
4.	Extent of injuries		Fatal
5.	Date & Time of Accident		06.10.2019; 0628 UTC.
6.	Place of Accident		Sultanpur Village, Telangana
7.	Co-ordinates of Accident Site		Lat: 17° 19' 0"N Long: 077° 46' 6" E
8.	Last point of Departure		Begumpet Airport, Hyderabad
9.	Intended landing place		Begumpet Airport, Hyderabad
10.	No. of persons on board		02 (including PIC)
11.	Type of Operation		Training flight (cross country)
12.	Phase of Operation		En-route
13.	Type of Accident		Aircraft encountered bad weather
14.	Damage to the Aircraft		Destroyed

(All the timings in the report are in UTC)

SYNOPSIS

On 6th Oct 2019, Cessna 172S aircraft VT-RGF belonging to M/s Wings Aviation Pvt. Ltd. was involved in a fatal accident at Sultanpur Village, (Telangana) while operating a training flight. The aircraft was under the command of a student pilot holding a valid student pilot license along with 01 person on board the aircraft. The trainee pilot was detailed for "solo cross country" flying from Begumpet to Begumpet overflying Gobur.

The Trainee Pilot took–off for a solo cross-country exercise from runway 27 of Begumpet airport. The airport weather at the time of take-off showed visibility of 5000 meters with winds 180°/03 kts. The aircraft after take-off changed over and came in contact with ATC Shamshabad. Initially, the aircraft was cleared to and maintained 4600 ft. Thereafter, the trainee pilot requested for climb to 6500 ft which was approved by ATC, Shamshabad. On reaching 6500 ft, the trainee pilot informed ATC, Shamshabad the estimate of GOBUR as 06:55 UTC and ETA VOHY (Bugumpet) as 07:50 UTC with inbound level of 7500 ft.

When the aircraft was around 40 NM (outbound) from Begumpet Airport, it was observed on RADAR display that the aircraft had climbed to 7400 ft and then descended to 6400 ft. The trainee pilot in view of heavy rain requested ATC, Shamshabad for descent to 4600 ft. and for return to Begumpet which was approved by ATC. The weather was very bad.

After couple of minutes, the RPS (Radar Position Symbol) of the aircraft disappeared from RADAR display and later it was found that, the aircraft had crashed in a cotton field in Sultanpur Village. The aircraft was destroyed during the accident and the wreckage was scattered within a radius of about 100 meters ahead of first point of impact as Centre. Both occupants received fatal injuries.

Sh. R S Passi, Director, AAIB was appointed as Investigator – In – Charge & Sh. K Ramachandran, Assistant Director, AAIB as Investigator to investigate into the probable cause(s) of the accident, vide Order No. INV.-11011/9/2019-AAIB dated 9th Oct 2019 under Rule 11 (1) of Aircraft (Investigation of Accidents and Incidents), Rules 2017.

1. FACTUAL INFORMATION

1.1 History of Flight

On 06.10.2019, Cessna 172 aircraft VT-RGF was involved in a fatal accident at Sultanpur Village of Vikarabad district, Telangana while operating a cross country training flight from Begumpet (Hyderabad) to Begumpet overflying Gobur. The aircraft was under the command of a trainee pilot holding a valid Student Pilot License.

For the purposes of imparting training in the organization, a day prior to the day of flying training exercise, the Dy.CFI/ CFI of the organization use to inform trainee pilots about the flying programme for the next day. Accordingly, the trainee pilots reported in the morning for their respective flying training exercise.

On the day of accident, the deceased trainee pilot reported for flying training exercise in the morning as per the programme. Trainee pilot did her Pre-Flight Breath Analyzer Test and was detailed for “solo cross country” exercise by the Dy.CFI as CFI was on leave. Initially, the training sorties for cross country flights were planned for 0200 UTC. However, due to visibility below 5000 m the flight plan was revised to 0400 UTC and then to 0500 UTC. As per the Dy. CFI, the flying was not started and they waited for weather to improve. At around 0500 UTC, the Dy.CFI observed that the weather including that of the area of cross country has improved (visibility was 5000 meters) and as per him, it appeared to be suitable for training flights.

Dy. CFI authorized the trainee pilot to fly solo cross-country flight on VT-RGF. This was trainee pilot’s 2nd solo cross-country flight. Her earlier cross-country flight was also on the same route. The trainee pilot after preparing the navigational log, flight plan, load & trim and MET folder had a briefing with Dy.CFI. She signed the authorization book and took permission from ATC for start up which was given by ATC.

As per the procedure, one of the AFIs of the organisation accepts the CRS of the aircraft, provided no abnormality is observed during aircraft visual inspection. The aircraft is then handed over to the trainee pilot. As per the

routine, the student pilot also carries out pre-flight inspection prior to undertaking the flight.

On the day of accident, the trainee pilot after carrying out flight briefing with Dy. CFI in his room, accepted the aircraft for undertaking the flight. As per the statements of eyewitnesses, before taxing out from the apron, a person came from the hangar and boarded the aircraft. As per Dy. CFI, he was in flight operations room and briefing a trainee pilot for an instrument flying sortie on VT-RGJ (P2006T) aircraft at Begumpet airport while the trainee pilot set out for her cross-country flight.

The trainee pilot taxied out at 0520 UTC and after obtaining clearance from ATC at 0550 UTC, took-off for the cross-country flight from runway 27. The visibility at the time of take-off was 5000 meters with calm winds. After take-off, the aircraft was handed over to ATC Shamshabad.

ATC Shamshabad cleared the aircraft to climb on track to 4600 ft and instructed the aircraft to contact Approach Radar (ASR). At 0601 UTC, aircraft contacted Approach Radar and reported maintaining 4600 ft. At 0604 UTC, aircraft was identified by Approach Radar Controller. At 0610 UTC, trainee pilot requested for climb to 6500 ft which was approved by ASR Controller. At 0615 UTC, the aircraft on reaching 6500 ft passed the estimate of GOBUR as 0655 UTC and ETA HHY VOR (Begumpet VOR) at 0750 UTC with inbound level of 7500 ft. At 0617 UTC, ASR controller passed traffic information to the aircraft i.e. regarding another training aircraft VT-YPR. That aircraft though was flying to GOBUR but had initiated return to Begumpet maintaining 5500 feet altitude, and this traffic information was acknowledged by the student pilot of the accidented aircraft.

At 062430 UTC, it was observed on RADAR that at 40 NM from HHY VOR, the aircraft, quickly climbed to 7400 ft and then descended to 6400 ft. At time 0627 UTC, the trainee pilot requested ASR controller for descent to 4600 ft due to heavy rain and her intention to return to HHY. The request was approved by ASR Controller.

At 0628 UTC, the RPS (Radar Position Symbol) of the aircraft disappeared from RADAR display. At 0630 UTC, ASR controller called the aircraft but there was no response. At 0632 UTC, ASR controller requested another aircraft to call VT-RGF and relay the position but there was no response to the repeated calls. At 0641 UTC, ASR controller informed VOHY (Begumpet) tower about the loss of contact with VT-RGF and lost position of the RPS. The ATC informed the operator about the same and informed local Police of VIKARABAD district about probable location of the occurrence.

The aircraft crashed in fields in Sultanpur village and was destroyed. Both occupants received fatal injuries.

1.2 Injuries to Persons

Injuries	Crew	Passenger(s)	Others
Fatal	01	01	NIL
Serious	NIL	NIL	NIL
Minor/ None	NIL	NIL	

1.3 Damage to Aircraft

The aircraft was destroyed during the accident.

1.4 Other Damages

Nil

1.5 Personnel Information

1.5.1 Student Pilot

Age	:	21 years
License	:	Student Pilot License (SPL)
Valid up to	:	12th August 2023
Category	:	Aeroplane (Single Engine)
Class II Medical	:	Valid
FRTO License	:	Valid
Total flying experience	:	89 Hours 05 Minutes
Total flying experience Solo	:	35 Hours 40 Minutes
during last 1 year	:	85 Hours 15 Minutes
during last 6 Months	:	63 Hours 40 Minutes
during last 30 days	:	17 Hours 05 Minutes

during last 07 Days : 02 Hours 50 Minutes

during last 24 Hours : Nil

The student pilot started her flying training in September 2018. She was released for solo flying on 31st March 2019 after obtaining flying experience of about 25 hours. She carried out her first solo cross-country flight (on the same route) on 03rd October 2019 after obtaining flying experience of 84 hours. The accidented flight was her second solo cross-country flight. All her flying training had been carried out on Cessna 152/172 aircraft.

1.5.2 Deputy Chief Flying Instructor

The Chief Flying Instructor (CFI) of the organisation was not available on the date of accident. Entire flying training operations were carried out under the supervision of Deputy Chief Flying Instructor (Dy. CFI).

The Dy. CFI joined the flying training organization in September 2017 as Assistant Flying Instructor (AFI). He held a valid Commercial Pilot License (CPL) and Instructors rating. As per the records, the Dy. CFI was qualified & certified to impart flying training instructions as per the existing regulations.

1.5.3 Other Occupant on board

The other occupant on board occupying the co-pilot seat was a valid CPL holder with 206:45 hours of flying experience. He had carried out his flying training from the same organisation and obtained his CPL on 17th July 2019.

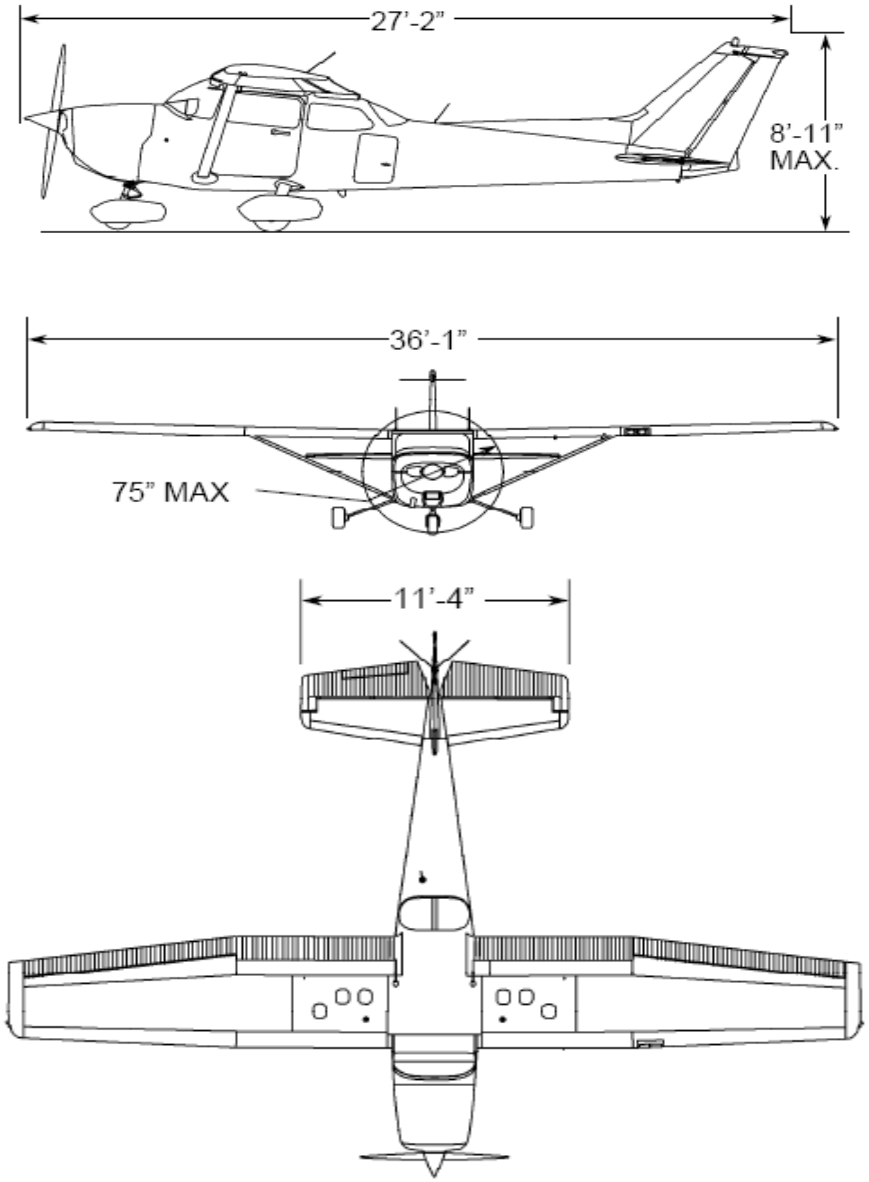
He was having the Airport Entry Pass which was issued to him while he was undergoing flying training to obtain his CPL. It was given to understand that his training for Assistant Flight Instructor Rating (AFIR) would have been taken up once the CFI joined back from leave.

1.6 Aircraft Information

1.6.1 General Description

Cessna 172S is a high wing monoplane of all metal semi-monocoque construction. It is designed for general utility and training purposes. The aircraft is equipped with fixed tricycle type landing gear with tubular spring steel main landing gear struts. The Nose Landing Gear is steerable and equipped with an Air/Hydraulic fluid shock strut. The aircraft is powered by a

horizontally opposed, direct drive, four-cylinder, overhead valve, air-cooled, fuel injected engine with wet sump lubrication system. The Engine is an AVCO-Lycoming Model IO-360 L2A with a horse Power rating of 160 BHP at 2700 RPM.



3 VIEW DIAGRAM OF CESSNA 172S AIRCRAFT

1.6.2 Aircraft Information (Specific)

Aircraft Model	:	Cessna 172 S
Serial No.	:	172S8450
Year of Manufacturer	:	2000
Certificate of Registration	:	3667/2

Certificate of Airworthiness	:	3076
C of A Validity	:	Valid at the time of accident
ARC issued on	:	08th August 2019
ARC valid up to	:	08th August 2020
Engine Type	:	Lycoming – IO360 – L2A
Engine Sl. No.	:	RL – 3386 – 51E
Propeller Type	:	1A170E/JHA 7660
Propeller Sl. No.	:	ABE47003
Aircraft Empty Weight	:	755 Kgs
Maximum Take-Off weight	:	1157 Kgs
Date of Aircraft weighment	:	7th February 2008
Total Aircraft Hours	:	8411:20
Engine Hours Since New	:	216:55
Engine Hours (Since Overhaul)	:	216:55

The aircraft was used for flying training purposes under Flying Training Organisation Approval No. 11/2016 issued on 4th April 2016 and valid upto 26th October 2020.

The aircraft was last weighed on 7th February 2008. Empty weight CG is 40.12 inches aft of datum.

Aircraft had logged 8411:20 hours till the date of accident. Last scheduled inspection carried out on the aircraft was 200 Hours/ 01-year inspection at 8393:55 airframe hours on 30th September 2019. Pre-flight inspection was carried out by the AFI before the first flight on the day of accident. The accidented flight was the first flight of the day on the aircraft.

As on date of accident, the aircraft engine had logged 216:55 Hours since new/ overhaul. Last scheduled inspection carried out on the engine was 200 hours/ 01year inspection at 199:30 engine Hours on 30th September 2019.

All concerned Airworthiness Directives, mandatory Service Bulletins, DGCA Mandatory Modifications on this aircraft and its engine had been complied with as on date of event.

Scrutiny of the Pilot Defect Register (PDR) revealed that, there was no snag pending on the aircraft prior to the accidented flight.

"Load and Trim" sheet of accidented flight was prepared and center of gravity was found within limit.

1.7 Meteorological Information

The Indian Metrological Department (IMD), MET office situated at Begumpet Airport issues the weather (METAR) and for carrying out cross country flights, trend is generally taken from IMD for Begumpet and 100 Nm around Begumpet.

Following METARs for Begumpet airport were issued between 0500 UTC to 0600 UTC.

Time (UTC)	Winds (º/Knots)	Visibility (Meters)	Weather	Clouds	QNH (HPa)	Temp/ DP (ºC)
0500	180/02	5000	Mist (BR)	SCT	1016	30/27
0530	180/03	5000	Haze (HZ)	SCT	1016	31/27
0600	190/02	5000	Haze (HZ)	SCT	1015	31/27
0630	130/04	5000	Haze (HZ)	SCT	1015	32/26

1.8 Aids to Navigation

Navigational aids available at Begumpet Airport were DVOR/DME. The aircraft was fitted with GPS, ADF (Automatic Direction Finder), VHF COM/ NAV, Transponder, VOR/ LOC Indicator and Glide Slope Indicator.

1.9 Communication

There was always two-way communication between the aircraft and ATC. The recording of the communication between the aircraft and ATC was mostly clear. ATC, Begumpet when asked to report flight details, the trainee pilot informed "POB 01 trainee name……endurance 0600 hours flying time 03 hours". The ATC again asked the trainee pilot to confirm POB on board for

which the trainee pilot informed 01. The reason mentioned by ATCO on duty for asking the POB again was that he could not hear clearly.

At the time of accident, the aircraft was on Shamshabad Approach Radar Frequency. The last communication made by the trainee pilot was "Descending to 4600 ft and setting course back to HHY" when the trainee pilot was reading back the approval given by ASR Controller to her request for descent to 4600 ft due to heavy rain and return to HHY.

1.10 Aerodrome Information

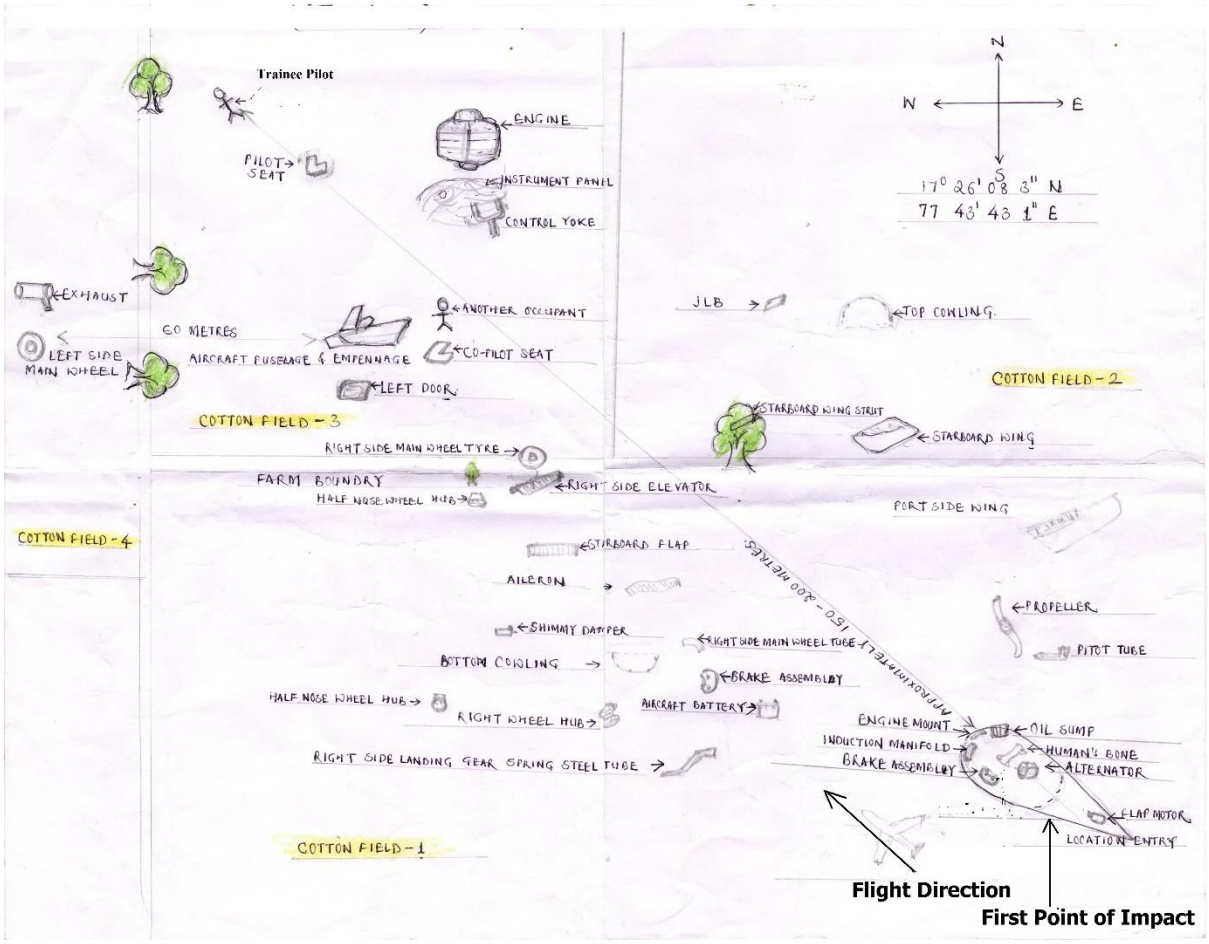
The Begumpet airport is owned and operated by Airports Authority of India. The elevation of the Begumpet airport is 1742 feet (531.5 meters). There is one runway (09/27) available with length of 3230 meters. The Flying Training Organisation is situated on the airport. The airport is a secured area and the security is provided by CISF.

1.11 Flight Recorders

Cockpit Voice Recorder (CVR) and Digital Flight Data Recorder (DFDR) were neither fitted nor required on this aircraft as per Civil Aviation Requirements.

1.12 Wreckage & Impact Information

The aircraft was destroyed during the accident. The aircraft wreckage was scattered in an area of about a radius of 100 meters ahead of first point of impact. The wreckage distribution is shown in following figure:



WRECKAGE DISTRIBUTION

1.13 Medical & Pathological Information

The trainee pilot had undergone pre-flight Breath Analyzer (BA) test before the flight.

Both occupants on board received fatal injuries. As per the post mortem report, the cause of death was due to severe crush injuries and also detachment of upper and lower limbs which lead to immediate hemorrhagic shock.

1.14 Fire

There was no pre or post impact fire.

1.15 Survival Aspects

The accident was not survivable.

1.16 Test and Research

Nil

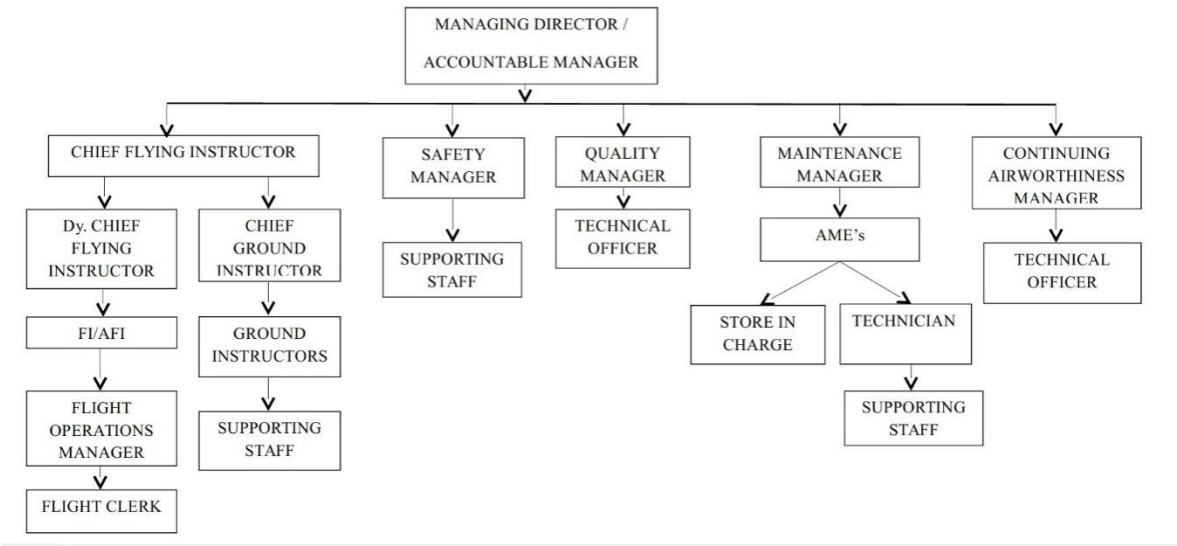
1.17 Organizational & Management Information

1.17.1 Wings Aviation Pvt. Ltd

M/s Wings Aviation Pvt. Ltd. is a Flying Training Organization (FTO) which has their base at Begumpet Airport, Hyderabad. The approval of Flying Training Organization (FTO) issued by DGCA on 4th April 2016 was valid upto 26th October 2020. As per the Certificate of Approval of FTO, the organization has approval for conducting flying training courses for

- Student Pilot License (SPL)
- Private Pilot License (PPL)
- Commercial Pilot License (CPL)
- Instrument Rating (IR)
- Assistant Flight Instructor (AFI) / Flight Instructor (FI) Rating
- Extension of aircraft rating single engine.

The Organisation Chart as per the Manual of the FTO is as shown below:



ORGANIZATION CHART

On the day of accident, the flying training academy had one CFI, one Dy.CFI and 04 AFI for imparting training to the student pilots. The FTO has in-house maintenance setup as per CAR 145 which is approved by DGCA and was valid on the day of accident.

The Flying Training Organisation (FTO) is situated at the airport. The airport is a secured area and the security is provided by CISF. The FTO applies for the Airport Entry Passes (AEP) for the student pilots enrolled with the FTO. The AEP is required to be returned to BCAS as soon as the flying training of the student is over and he is provided with the documents for the purpose of issuance of CPL by DGCA.

1.17.2 Earlier Accident

As per the records, there has been an accident earlier involving aircraft of the FTO in the past. Cessna 152 aircraft VT-RGC was involved in an accident while operating training flight of solo circuit & landing near Samshabad Airport on 21st November 2018. The accident was related to loss of power in flight.

The cause of the accident was *"Fracture of the crankcase due to breaking of connecting rod caused engine oil loss thereby causing engine seizure". Cause of breaking of connecting rod however could not be established.*

1.17.3 Training and Procedure Manual (TPM) of the Organization

The salient portion of duties & responsibilities of CFI & Dy. CFI as mentioned in the TPM is reproduced below.

The Chief Flight Instructor is responsible for the flight operations in the Academy. The CFI is responsible for monitoring the flying operations. It is the responsibility of the CFI to ensure safe and efficient operation. The relevant functions are: -

- To supervise and authorize flying done by Flight Instructors, Assistant Flight Instructors and Trainee Pilots.
- To supervise and control the working of the Academy and detailing duties to different staff i.e. Flight Instructors, Assistant Flight Instructors and Operations Assistants.
- To see that the training is done as per DGCA requirements and that the instructors and trainee Pilots follow the Indian Aircraft Rules, 1937.

- To decide whether the weather conditions and facilities available are suitable for the proposed flight

The Deputy Chief Flight Instructor reports to the CFI and he is responsible for the flight operations of the Academy in the absence of CFI. The relevant duties and responsibilities are:

- To authorize flights of the aircraft operated by the FTO for which it is approved and to ensure safe and efficient operation
- To act as overall in-charge of the flying training activities of his institute /club / school in absence of CFI.

So Dy. CFI is also required to supervise and authorize flying done by Trainee Pilots and to see that the training is done as per DGCA requirements. It is also to be ensured that the weather conditions and facilities available are suitable for the proposed flight

1.17.4 Solo flying

The definition of solo flight as mentioned in the TPM is "*Flight time during which the pilot is the sole occupant of an aircraft* ".

1.17.5 Directorate General of Civil Aviation - Oversight Functions

As per Section 4A of the Aircraft Act 1934, the DGCA or any other officer specifically empowered in this behalf by the Central Government shall perform the safety over sight functions in respect of matters specified in the act or the rules made there under.

One of the primary functions of DGCA as per the Organisation Manual of DGCA, is also "Safety Oversight of all entities approved/ certified/ licensed" under the Aircraft Rules 1937. Different directorates of DGCA carry out the over sight functions in the form of regulatory audits, surveillance, spot checks etc. on the various stake holders. DGCA team had carried out audit/ surveillance of the FTO before and after the accident.

Under State Safety Program also, DGCA is required to make the Safety Performance Indicators (SPIs) for the organization being regulated. By taking continuous proactive safety actions, DGCA has to ensure that value of these Safety Performance Indicators is within prescribed limits.

Rule 156 of Aircraft Rules, 1937 authorises the Director General, or any officer of the Directorate General of Civil Aviation authorised by him to inspect an aircraft or aviation facility for various purpose including surveillance so as to ensure continued compliance of regulations issued from time to time.

1.17.6 Surveillance of FTO (Before Accident)

DGCA surveillance team had carried out Annual Surveillance of the Organisation from 16.07.2019 to 18.07.2019, i.e. 2 and half months before the accident. The Operational Deficiencies observed during the surveillance were: -

1. TPM needs to be amended.
2. Authorization book needs to be maintained as per CAR.
3. Contingency Plan needs to be amended as per TPM.
4. Flying Order book not proper and Read & Understood sheet to be made.
5. Record of results to be entered in FTPR and to specify the exercises instead of General Flying.
6. All exercises to be covered for student pilots during flying training.
7. MET is being taken but no proper record has been maintained.
8. First Aid kit in the hangars First Aid Room is not proper.

1.17.7 Audit of FTO (after the accident)

DGCA team also carried out an audit of the organisation after the accident on 17th & 18th December 2019. No Operational deficiency was observed. The FTO was, however, asked to take necessary corrective measures. Relevant portion of the report is reproduced below: -

- Present post holders such as Accountable Manager, Quality Manager, CA Manager and Maintenance Manager are still on the rolls of the organization. However, the organization has submitted documents of nomination of new team of Accountable Manager, Quality Manager, CA Manager and Maintenance Manager. Also, an undertaking was given by the Accountable Manager that the Police Verification of Post Holders will be submitted as soon as possible, within a period of three months.

- CFI has been asked to provide proof of utilization of Breath Analyzer by CFI/ AFIs and trainees. Photographic evidence of Breath Analyzer tests has been provided by the CFI. Further, the Accountable Manager has been briefed regarding the requirement of BA testing of AMEs and technicians and has been advised to maintain a record to that effect.
- CFI has been advised to carry out briefing of student pilots & Instructors two to three times daily on weather conditions/met and especially before undertaking cross country flights and to maintain a register to that effect. An undertaking to comply with the same has been submitted by CFI. The register, opened for the purpose, has been shown to the inspection team.
- During the inspection, it has been observed that none of the maintenance/flying teams were seen wearing the "High Visibility Jackets". The same has been pointed out and CFI has been asked to immediately procure High Visibility Jackets as per requirements. Further, CFI has been advised to ensure that all flying as well as maintenance personnel to put on high visibility jackets in the aircraft movement area. Adequate High Visibility Jackets have been procured and photographs of personnel wearing high visibility jackets have been submitted.
- While going through the aircraft documents and insurance details, it has been observed that the insurance value of seats is on the lower side (Rs. 5 Lacs per seat). The Accountable Manager has informed that they are in the process of increasing the insurance benefits to maximum level. An undertaking to this effect has been submitted by Accountable Manager.

In addition to the above points, following was also advised: -

“CFI has been advised to ensure the pilot training is conducted strictly as per regulations without any deviation. All sorties including solo and cross-country flights should be as per applicability with complete safety norms and more emphasis to be given on weather briefings. Further,

CFI has been asked to add all the above points to FOB and get it signed by students and instructors as read and understood. As advised, FOB has been put up to me for perusal."

1.18 Additional Information

1.18.1 Aircraft Rules 1937 - Schedule II, Section 'Q'

Schedule II, Section Q of Aircraft Rules, 1937 stipulates the requirements of Assistant Flight Instructor's Rating**.** Relevant portion of the Rule is as follows: -

Requirements for issue of Rating — An applicant for an Assistant Flight Instructor's Rating shall satisfy the following requirements: —

(a) ----------

(b) ----------

(c) Experience — He shall produce evidence of having satisfactorily completed as pilot of an aeroplane on the date of application for the rating

- not less than one hundred hours of flight time as a Pilot-In-Command of an aeroplane of which not less than twenty hours shall have been completed within a period of eighteen months immediately preceding the date of application;
- not less than twenty hours of flying training as an Instructor under an approved Flight Instructor/ Examiner as per the syllabus prescribed by the Director-General.

(d) ----------

(e) Skill — He shall have demonstrated to the satisfaction of the Examiner his competency as an Assistant Flight Instructor by performing the procedures and manoeuvres prescribed in the syllabus within a period of six months immediately preceding the date of application.

1.18.2 DGCA CAR Section 7, Series 'I', Part - V – Criteria for approval of Chief Flight Instructor and Dy. Chief Flight Instructor for Flying Training Organisations.

This CAR lays down the minimum requirements and procedure for approval of designated examiner and the functions delegated to them to be performed in

FTO. As per this CFI and in his absence Dy. CFI shall be overall in-charge of the Flying Training Activities. He shall ensure compliance of Aircraft Rules, CAR, Directions issued by DGCA during conduct of training activities. He shall ensure proper implementation of Training and Procedure Manual (TPM) and Quality Assurance Manual (QAM) in the training activities. All correspondences of FTO with DGCA on training matters shall be under signature of CFI/ Dy. CFI only.

The CAR also enumerates the functions of Dy. CFI and the relevant ones are:

- To authorize flights of the aircraft operated by the FTO or for which it is approved.
- To act as overall in-charge of the flying training activities of his institute/ club/ school in absence of CFI.
- To authenticate the entries in the pilot's logbook.
- To ensure conduct of Ground and Flying Training as per Training and Procedure Manual (TPM).

1.18.3 Other Person on Board

The other person on board was a CPL holder who did his flying training from the same FTO. As per the procedure, the AEP which was issued to the occupant for entering the airport to carry out the flying training exercise was surrendered to flight clerk by the occupant after completion of his flying training. The AEP was then handed over to Chief Security Officer of the organisation. However, the same was later released and handed over to the occupant on request. As per the statement of CFI, the occupant was planning to do his AFIR from the organisation and was supposed to start his Patter Flying Training after arrival of CFI from leave.

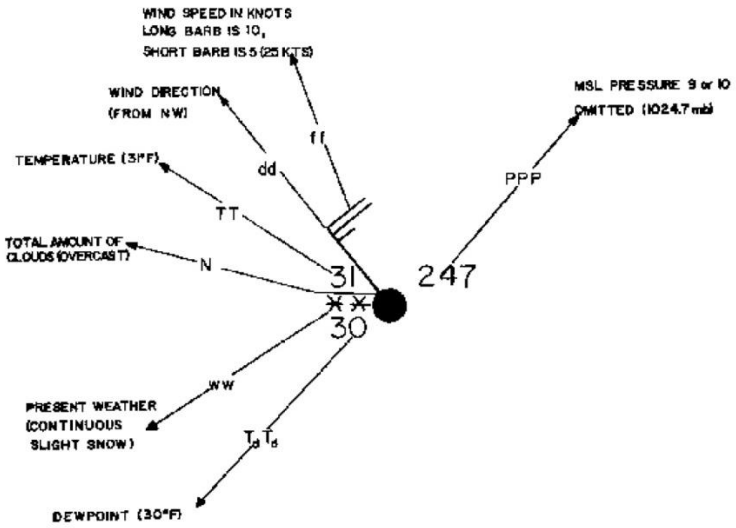
The CPL of the other person on board was issued on 17.07.2019. Scrutiny of the Authorization Book revealed that the occupant had carried out 07:45 hours of flying including 02:35 hours of night flying with another CPL holder between 25th August 2019 & 4th September 2019. All these exercises were authorized by the CFI of the Organisation.

As per the statement of the Dy.CFI, there is a system in the organisation to send someone along with the student in solo flight to ensure their safety. The same system is being followed even after the accident.

1.18.4 Wind Shear

Wind shear is a rapid change in wind speed or direction over a relatively short distance in the atmosphere. This shear can be both either vertical or horizontal. Vertical wind shear is a change in wind speed or direction with change in altitude. Horizontal wind shear is a change in wind speed with change in lateral position for a given altitude.

Wind shear conditions can occur at low as well as high altitudes. Horizontal wind shear is most frequently experienced when crossing fronts or flying in the vicinity of mountainous areas. Vertical wind shear can be experienced anywhere from the surface to upper Flight Levels (FLs) – particularly it is associated to thunderstorm conditions. The most dangerous conditions are when flying at lower levels.



WIND SHEAR REPRESENTATION

Wind shear codes for speed, direction, temperature clouds, dew point etc. are shown in the above figure. Wind shear measured in knots, is either positive or negative. Increases in wind shear value are positive numbers, while decreases are noted as negative values. When operating in the upper

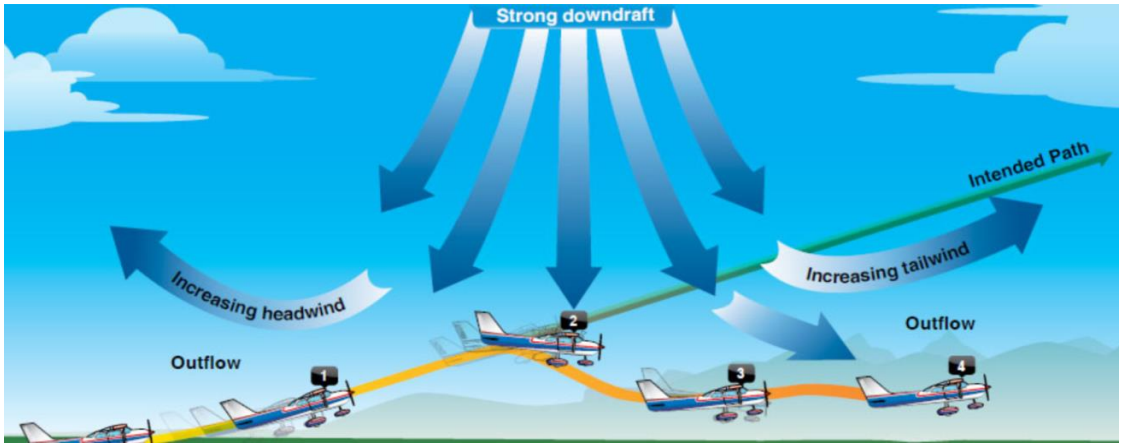
atmosphere, wind shear value is almost always positive. Closer to the ground, one may experience negative wind shear values.

Symbols used for the quantum of wind shear are shown below.

SYMBOL	Knots
	Calm
	1– 2
	3– 7
	8– 12
	13– 17
	18– 22
	23– 27
	28– 32
	33– 37
	38– 42
	43– 47
	48– 52
	53 57
	58– 62
	63 67
	68– 72
	73– 77
	103–107

WIND SHEAR CODES

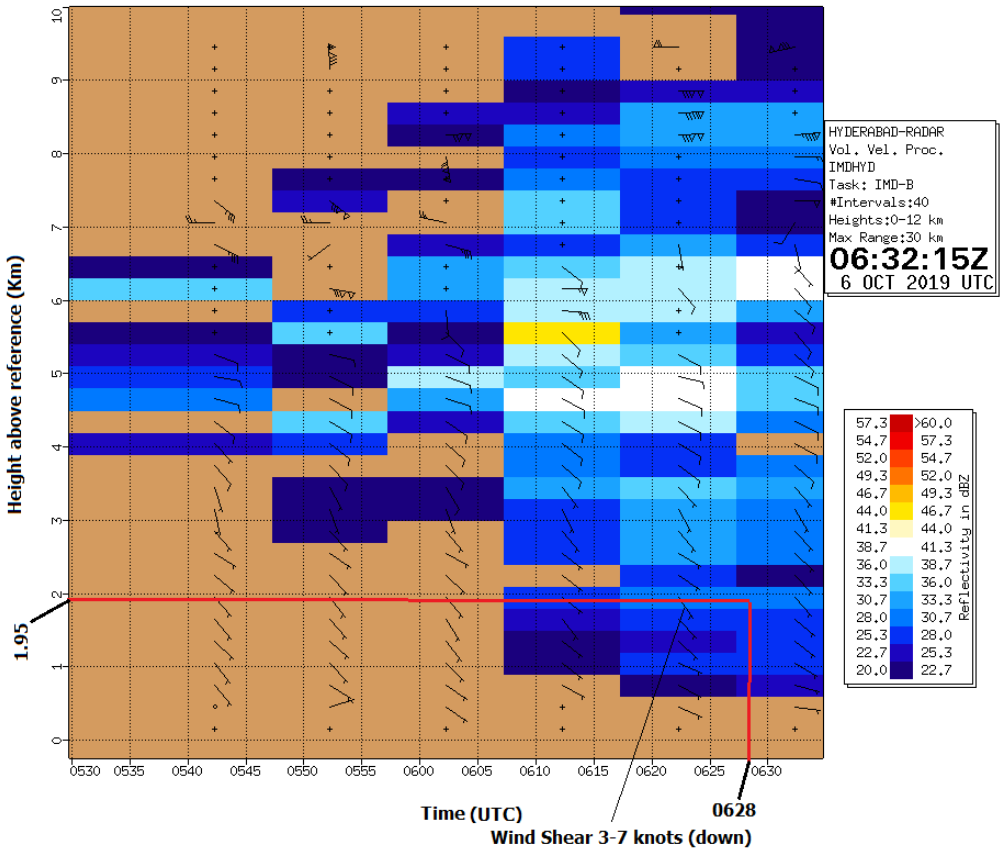
Wind shear has significant affects on control of an aircraft. It causes rapid change in lift, and thus the altitude, of the aircraft. Strong outflow from thunderstorms causes rapid changes in the three-dimensional wind velocity just above ground level. Initially, this outflow causes a headwind that increases airspeed, which normally causes a pilot to reduce engine power if they are unaware of the wind shear. As the aircraft passes into the region of the downdraft, the localized headwind diminishes, reducing the aircraft's airspeed and increasing its sink rate. Then, when the aircraft passes through the other side of the downdraft, the headwind becomes a tailwind, reducing lift generated by the wings, and leaving the aircraft in a low-power, low-speed descent.



AIRCRAFT UNDER STRONG DOWNDRAFT

1.18.5 Weather Trend from IMD, Hyderabad

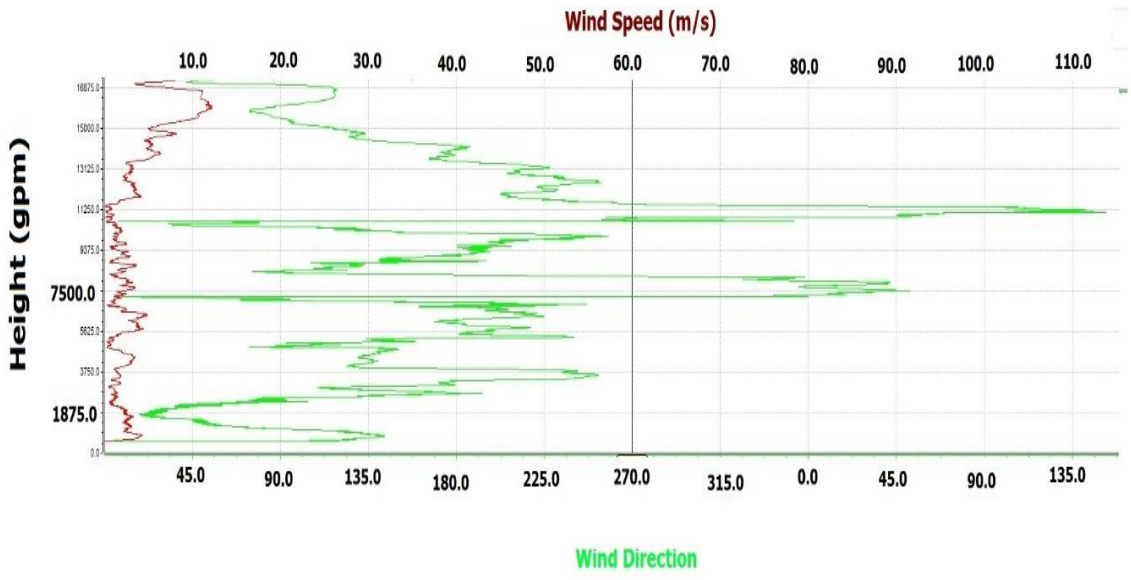
In addition to the general MET information provided by IMD (Refer Para 1.7), weather trend with respect to change in altitude from time 0530 UTC to 0635 UTC was obtained from IMD, Shamshabad to study the prevailing weather conditions in the area which the aircraft could have encountered during flight. The weather trend provided by IMD (reflectivity Index v/s height) is as given below:



REFLECTIVITY INDEX WITH HEIGHT FROM 0530 UTC TO 0630 UTC

The above graph shows reflectivity index (in dBZ) viz-a-viz height (altitude in Kms) from 0530 to 0630 UTC. Areas of heavy precipitation (with big raindrops or snowflakes) return a lot of power to the radar and appear as brighter colors in reflectivity images. In this reflectivity image, the heaviest precipitation is in red, while lighter precipitation is in blue and green. The colours - yellow, orange and white shows moderate precipitation.

The aircraft after obtaining clearance from ATC for return was maintaining altitude of approximately 6400 feet (1950 meters) when it disappeared from the radar. At that time as per the above graph the precipitation was moderate with reflectivity value between 30.7 to 33.3 dBZ (decibel relative to equivalent reflectivity factor). The wind shear symbol indicates downwind shear of 3-7 knots just prior to accident.



VARIATION OF WIND (SPEED & DIRECTION) WITH HEIGHT (ALTITUDE)

The above graph shows variation of wind speed (shown in red) and wind direction (shown in green) with height (in gpm) around the time of accident. As per the graph, the wind direction variation with height is sudden & very erratic, thereby indicating wind shear phenomenon. The wind speed variation with height was moderate and at an altitude of 1950 meters the wind speed was app. 4 knots.

1.19 Useful and Effective Techniques

NIL

2. ANALYSIS

2.1 Serviceability of aircraft

The aircraft manufactured in year 2000 was having a valid Certificate of Registration (C of R) at the time of accident. It was holding a valid Indian Certificate of Airworthiness (C of A) under Normal category and Passenger Sub-Division. Airworthiness Review Certificate (ARC) was valid at the time of accident. There was no snag reported before the accidented flight.

All concerned Airworthiness Directives, mandatory Service Bulletins, DGCA Mandatory Modifications on this aircraft and its engine were complied with as on the date of accident. The CG of the aircraft was within limits.

2.2 Weather

The weather reported at and around Begumpet airport at the time of accident was visibility 5000 meters, with winds 130^{o}/04 knots and scattered clouds. This was the information available with the FTO. Weather as per this information and observations made by Dy. CFI was found suitable for carrying out the cross-country flight.

During investigation, weather trend (variation) with altitude was obtained from IMD, Shamshabad, which revealed that just prior to the accident at an altitude of 6400 feet (1950 meters) there was a downward wind shear of 3 to 7 knots with moderate precipitation. The same was corroborated from the graph of variation of wind (Speed & Direction) v/s height. The graph showed that the wind direction variation with height (including altitude of 1950 meters) was sudden & very erratic, thereby indicating wind shear phenomenon. The shear phenomenon continued for some time around the accident location.

The damage to aircraft and scatter of the wreckage also fully conform to the aircraft entering very bad weather. There was no indication of aircraft disintegrating in air. Because of getting engulfed into a heavy downdraft, it had impacted the ground with heavy force, while in forward motion and little nose down attitude.

In view of the above it can be safely concluded that the aircraft had encountered downward wind shear at a lower altitude which resulted into sudden sinking of the aircraft followed by heavy impact with the ground.

2.3 Organizational Aspect

2.3.1 Circumstances of other person on board a solo flight

In this paragraph FTO means Wings Aviation Pvt. Limited and 'the person" means the second occupant of the solo flight.

The accidented flight was second cross-country flight of the trainee pilot and as per the record it was solo flight. Even the ATCO had enquired about POB, which was replied to as one. In the present case, as the ATCO could not hear the reply of the PF clearly, he has asked again about POB which was confirmed as "one".

Many a question arise regarding the circumstances under which an additional person boarded the flight and unfortunately, he also suffered fatal injuries.

Who was he?

He was earlier a student pilot with the FTO and had undergone flying training at FTO for the purposes of obtaining CPL. The FTO is at secured portion of the airport and as such Airport Entry Pass (AEP) issued by BCAS was required for undergoing flying training. After completion of his flying requirements, he was issued with necessary documents to apply to DGCA for issue of CPL and at that time his AEP issued by BCAS which was still valid was returned to the FTO for submission to BCAS as per the procedure in that regard.

The Chief Security Officer of the flying club had received the AEP in June 2019 or early and the person was issued CPL by DGCA on 17.07.2019.

How could he enter the Airport?

The question was raised with the CFI, Chief Security Officer (CSO) and other officials of the FTO. It was informed that he had entered the airport because he was having the above-mentioned AEP with him.

As per the CSO of the FTO, the AEP was returned to the person on written request of the then Dy. CFI on 9th August 2019. Neither Dy. CFI had mentioned any reason, nor the CSO nor his subordinates have asked for the requirement of AEP. So, the AEP was lying with the FTO for more than a month and was not returned to BCAS as per the requirements.

All said & done, the person was able to enter the airport based on the AEP which was issued to him as student pilot for undergoing flying training and was supposed to have been returned to BCAS by the FTO after completion of the flying training of "the person".

Was the person regularly coming to the flying club? Purpose?

Though the CFI has mentioned that the person was not being utilized for any activity of the flying club, it was observed from the Authorization Book of FTO that the person had carried out flying between 25th August 2019 and 4th September 2019. All these fights were authorized by CFI of the FTO, so it can be safely concluded that the person had continued to visit the airport & FTO and was carrying out flying on the aircraft belonging to the FTO.

Relationship of the FTO & the person

The facts as mentioned above i.e.

(a) The valid BCAS AEP was returned to the person by the FTO
(b) He had flown on the aircraft belonging to the FTO, and was thereby accumulating additional hours.
(c) The intention of the FTO to start his patter flying to attain AFIR.

indicate that though there were no direct orders/letters given to the person by FTO, he was at the premises of FTO with the tacit understanding that he will be with the FTO in future for the purposes of attaining AFIR and may be absorbed as AFI.

Solo flying – Procedures

As per the definition of solo flying, it is the "flight time during which the pilot is the sole occupant of an aircraft". The accidented flight was authorized and

documented as solo flight. As per the definition, the trainee pilot alone should have been the occupant, but there was another person on board. Though the Dy. CFI who has authorized the solo flight maintains that he was in his office when the aircraft moved from the tarmac for the cross-country flight but it is neither according to the flying best practice nor otherwise acceptable. He himself has mentioned in his statement that there was a system in the FTO to send someone along with the student in solo flight to ensure their safety. He has further stated that the system was being followed even after the subject fatal accident.

The overall big picture, therefore, indicates that CFI/ Dy. CFI followed the unwritten/ undocumented procedure of sending some senior person, may be an Instructor or a CPL holder along with the trainee pilot on solo flights, on case to case basis. The reasons could have been bad weather, trainee pilot not confident, cross country flights etc.

2.3.2 Safety Oversight Function by DGCA

The Aircraft Act, the Rules and Regulations require that the office of DGCA shall perform the safety over sight functions in respect of matters specified in the act and rules made there under. This function, no doubt is a top priority for any regulator and has to be carried out with utmost sincerity giving meaningful observations/ findings from safety/ operational perspective.

Surveillance of the FTO was carried out by DGCA in July 2019 i.e. before the accident. The observations made during the surveillance were generic in nature and were primarily related to documents and records maintained by the FTO. At the most, there were some points on the facilities but there was no observation concerning operational/ flying safety deficiencies which were observed during this investigation. There was no observation either on the flight clearance procedures, briefing methodology or final release of the sortie.

As per the documents scrutinized during investigation, it was observed that a team of DGCA carried out an audit of the organisation in December 2019, i.e. after the accident. Once again, during the audit, no operational deficiencies were found or flagged. Some necessary corrective measures were suggested

to the FTO and assurances given by the post holders of the FTO were made part of the report. These could be related directly to the prima facie evidences available after the accident such as weather briefing, insurance etc. Deeper and closer look into the report of the audit team indicates that the purpose of this audit was not proactive but rather was to restart the flying activities of the FTO at the earliest.

It is, therefore, concluded that the reports of surveillance/audit carried out by the DGCA teams of the FTO were not in true letter and spirit. Otherwise, the procedural anamolies and safety lapses observed during accident investigation could have been easily captured during the regulatory audits/ surveillances.

2.4 Circumstances Leading to the Accident

The trainee pilot was informed about the flying programme a day before. Accordingly, on the day of accident, the deceased trainee pilot reported for flying training exercise in the morning. The trainee pilot was detailed for “solo cross country” exercise by the Dy.CFI. However, the training exercises did not start until 0500 UTC as visibility was below 5000 meters. Later on, once it was observed that the weather has improved (visibility was 5000 meters) and appeared to be suitable for training flights, the cross-country flight was authorised.

In the absence of CFI, Dy. CFI had authorized the trainee pilot to fly solo cross-country flight from Begumpet to Begumpet overflying Gobur. This was trainee pilot’s 2nd solo cross-country flight on the same route and was briefed by Dy.CFI before proceeding for flight. The trainee pilot carried out pre-flight inspection and before taxing out from the apron, a person came from the hangar and boarded the aircraft. As the FTO had a practice/ Norm of sending an instructor or a CPL holder along with the trainee pilot on solo flights (on case to case basis), the Dy.CFI, in view of the marginal weather might have asked the person (a CPL holder) to accompany the trainee pilot for cross country flight. As per Dy.CFI statement, during this time, he was in flight operations room busy in briefing another trainee pilot which implies that he was not supervising the flight as per the requirement. However, as per the

statement of engineering personnel present at Hangar at that time, the Dy.CFI was present in the hangar when the aircraft taxied out from the apron.

The trainee pilot taxied out at 0520 UTC and at 0550 UTC after obtaining clearance from ATC, Begumpet, took-off for the cross-country flight from runway 27. The ATCO enquired about POB, which was replied to as one. ATCO could not hear the reply of the PF clearly and asked again about POB which was confirmed as “one”.

The weather at the time of take-off was visibility 5000 meters with winds calm. After take-off, the aircraft was handed over to ATC Shamshabad.

The aircraft was initially given clearance to climb on track to 4600 ft and was later cleared for climb to 6500 ft (outbound operating altitude for cross country). At 062430 UTC, i.e. after 34 minutes of take-off and at 40NM from HHY VOR, the aircraft, quickly climbed to 7400 ft followed by a descent to 6400 ft. This implies that the aircraft had encountered inclement weather. At that time the precipitation was moderate with reflectivity value between 30.7 to 33.3 dBZ (decibel relative to equivalent reflectivity factor) and there was downward wind shear of 3-7 knots. This was further confirmed when, at 0627 UTC, the trainee pilot requested ATC for descent to 4600 ft due to heavy rain and return to HHY (Begumpet). The request was approved by ASR Controller. The aircraft during descent could have encountered downward wind shear, during which the speed of the aircraft got reduced. There was sudden increase in its sink rate due to sudden reduction in lift. As the aircraft was low, there was no time/ height available for the trainee pilot to affect a recovery, and the aircraft impacted the ground at high vertical speed resulting into aircraft disintegrating into pieces and leading to the accident.

3. CONCLUSION

3.1 Findings

3.1.1 The aircraft was having valid C of R, C of A & ARC on the day of accident.

3.1.2 The aircraft and its engine were being maintained as per continuous maintenance programme approved by DGCA.

3.1.3 No inspection/Maintenance action was due on the aircraft & its engine as on date of accident.

3.1.4 All concerned Airworthiness Directives, mandatory Service Bulletins, DGCA Mandatory Modifications on this aircraft and its engine had been complied with as on date of event.

3.1.5 Scrutiny of the Flight Release Book (FRB) revealed that, there was no snag pending on the aircraft prior to the accidented flight.

3.1.6 The deceased trainee pilot was having a valid student pilot license and was certified & qualified for the flight.

3.1.7 On the day of accident, the flying training exercises were authorized by Dy. CFI as CFI was on leave.

3.1.8 The training sorties for cross country flights were planned for 0200 UTC. However, due to visibility below 5000 m the flight plan was revised to 0400 UTC and then to 0500 UTC.

3.1.9 At around 0500 UTC, the visibility improved to 5000 meters and Dy. CFI decided to start the training exercise.

3.1.10 Dy. CFI had authorized the trainee pilot to fly solo cross-country flight from Begumpet to Begumpet overflying Gobur.

3.1.11 Before taxing out from the apron, a person (other occupant) came from the hangar and boarded the aircraft.

3.1.12 Though Dy. CFI maintained that he had not supervised the departure of aircraft from hangar, an eyewitness had mentioned that he was available at apron.

3.1.13 ATC, Begumpet when asked to report flight details, the trainee pilot informed “POB 01….”. The ATC again asked the trainee pilot to confirm POB for which the trainee pilot confirmed 01.

3.1.14 The aircraft took-off at 0550 UTC with 02 persons on board. The weather at the time of take-off was visibility 5000 meters with winds calm. After take-off, the aircraft was handed over to ATC Shamshabad.

3.1.15 At 0610 UTC, trainee pilot requested for climb to 6500 ft which was approved by ASR Controller.

3.1.16 At 062430 UTC, it was observed on RADAR that at 40NM from HHY VOR, the aircraft, quickly climbed to 7400 ft and then descended to 6400 ft.

3.1.17 At that time the precipitation was moderate, however, there was downward wind shear of 3-7 knots.

3.1.18 At time 0627 UTC, the aircraft requested ASR controller for descent to 4600 ft due to heavy rain and return to HHY. The request was approved by ASR Controller.

3.1.19 The aircraft encountered inclement weather i.e. downward wind shear, during which the speed got reduced and the aircraft sank at a faster rate due to sudden reduction in lift.

3.1.20 As the aircraft was low, there was no time/ height available for the trainee pilot to affect a recovery, the aircraft impacted the ground at high vertical speed and disintegrated into pieces.

3.1.21 At 0628 UTC, the RPS (Radar Position Symbol) of the aircraft disappeared from RADAR display.

3.1.22 Both occupants received fatal injuries.

3.1.23 Findings concerning additional person on board: -

- He was a CPL holder (issued on 17.07.2019) who did his flying training from the same FTO.
- The AEP surrendered to the FTO by him after completion of the flying training was later released and handed over to him on request dated 09.08.2019 by Dy.CFI.

- He was planning to do his AFIR from the organisation and was supposed to start his Patter Flying Training after arrival of CFI from leave.

- Scrutiny of the Authorization Book revealed that he had carried out 07:45 hours of flying including 02:35 hours of night flying with another CPL holder between 25th August 2019 & 4th September 2019. All these exercises were authorized by the CFI of the Organisation.

3.2 Probable Cause of the Accident

The accident occurred because the aircraft encountered wind shear, when it was descending to avoid sudden severe bad weather around 6000 feet, resulting in vociferous sink at low altitude leaving no time to affect a recovery.

4 Safety Recommendations

4.1 DGCA should carry out its Safety Oversight function over FTOs in a more meaningful manner covering all the aspects of operational procedures and flying training.

4.2 DGCA should advise all CFIs to ensure that the pilot training is conducted strictly as per the laid down regulations and without any deviation. Due emphasis should be given by CFIs on safety and weather briefings.

4.3 All flying training organizations should develop a full proof system of 100% supervision of the training sorties by CFI or Dy.CFI as stipulated in the DGCA CAR on the subject.

(K. Ramachandran)
Investigator

(R S Passi)
Investigator- In-Charge

Date: 01.06.2020

Place: New Delhi