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FINAL REPORT ON ACCIDENT TO
IGRUA ZLIN242L AIRCRAFT VT-IGM
ON 21ST OCT 2019 AT FURSATGANJ
AIRFIELD, UTTAR PRADESH

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 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.

GLOSSARY

AAIB	Aircraft Accident Investigation Bureau, India
ADC	Air Defence Clearance
AME	Aircraft Maintenance Engineer
AMM	Aircraft Maintenance Manual
API	Assistant Pilot Instructor
ARC	Airworthiness Review Certificate
ATD	Actual Time of Departure
ATC	Air Traffic Control
AUW	All Up Weight
BHP	Brake Horse Power
C of A	Certificate of Airworthiness
CAR	Civil Aviation Requirement
CFI	Chief Flying Instructor
CG	Centre of Gravity
CVR	Cockpit Voice Recorder
DFDR	Digital Flight Data Recorder
DGCA	Directorate General of Civil Aviation
ELT	Emergency Locator Beacon
FAA	Federal Aviation Administration
FAB	Flight Authorization Book
FRTOL	Flight Radio Telephone Operators License
FTO	Flying Training Organization
Gal/Hr	Gallons/ Hour
Hrs	Hours
ICAO	International Civil Aviation Organization
IFR	Instrument Flight Rules
IST	Indian Standard Time
KIAS	Knots Indicated Air speed
Lat	Latitude
Long	Longitude
Ltr/Hr	Litre/Hour
METAR	Meteorological Terminal Aviation Routine
MTOW	Maximum Takeoff Weight
NM	Nautical Miles
NSOP	Non- Scheduled Operating Permit
PI	Pilot Instructor
PIC	Pilot in Command
POH	Pilot's Operating Handbook
PSWS	Pilot Safety and Warning Supplement
RPM	Rotation Per Minute
RT	Radio- Telephony
RTR	Radio- Telephony Restricted
SOP	Standard Operating Procedure
SPL	Student Pilot Licence
TSN	Time Since New
VFR	Visuals Flight Rules
UTC	Coordinated Universal Time

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EXECUTIVE SUMMARY

Date and Time : 21 Oct 2019 at 1520 IST

Aircraft

Type : ZLIN 242L

Nationality : Indian

Registration : VT-IGM

Accident Location : 26.2478°N 81.3812°E

Aircraft Owner and Operator : Indira Gandhi Rashtriya Udan Akademi

Type of flight : Training Flight: Circuit & Landing (Solo)

Phase of the flight : Landing

Type of Accident : Runway Excursion

Last point of Departure : Fursatganj Airfield (Distt-Amethi)

Point of intended landing : Fursatganj Airfield (Distt -Amethi)

Person(s) on board : One (Student Pilot)

Pilot in Command : Student Pilot Licence

(All timings are in IST unless otherwise stated)

ABSTRACT

On 21.10.2019, ZLIN 242L aircraft VT-IGM belonging to IGRUA while operating a local training flight was involved in an accident at 1520 IST at Fursatganj Airfield, Uttar Pradesh.

On the day of accident, Student Pilot was planned by CFI for second solo circuits and landing exercise. Student Pilot reported to base at 0700 Hrs IST and underwent breath analyzer test, which was negative. After authorization by CFI, Student Pilot along with Flying Instructor had carried out pre-flight inspection on the aircraft. Prior to accidented flight, Student Pilot was briefed about the ***Circuit & Landing Exercise Procedure*** for runway 27 by Flight Instructor.

The Student Pilot along with the trainer (Flying Instructor) carried out 06 (Six) circuits and landing prior to the accidented flight. After completion of six circuits and landing exercises alongwith flying instructor uneventfully, Student Pilot was released

for second solo circuits and landing exercise. Student Pilot lined up for solo circuit after obtaining ATC clearance and took-off from runway 27. Finally, aircraft joined the final approach leg and prepared for landing. No abnormality was reported on the aircraft by Student Pilot at any phase of exercise.

As per the statement of Student Pilot, during final approach, engine was put to idle and aircraft speed was reduced upto 80 knots when it was on short finals. However, aircraft was high on approach. While attempting to land, aircraft encountered stall and Student Pilot lost control. Thereafter, aircraft bounced after first touchdown and veered towards left. The student pilot gave full power and tried to control the aircraft, however, it went out of runway. The aircraft travelled approx. 1000 ft longitudinally (from RS128-runway edge light) and 180 ft laterally from runway edge. The aircraft finally rested over drain located left of the runway with heading 180 degree.

After the accident, ATC activated the siren and emergency services. Aircraft was substantially damaged due to post impact fire, however, Student Pilot didn't receive any injuries during the accident.

Occurrence was classified as Accident as per the Aircraft (Investigation of Accidents and Incidents) Rules, 2017. DG-AAIB issued AAIB Order-Accident vide file No. INV. 11011/10/2019-AAIB dated 24th October, 2019 appointing Shri Anil Tewari, Director, AAIB as an Investigator-in-Charge and Shri Dinesh Kumar, Air Safety Officer as Investigator.

Probable Cause

Aircraft was high on approach while landing and during flaring, aircraft entered into stall due to which aircraft suddenly lost height, thereafter, improper corrective measure to recover the aircraft from bounce, resulted into the accident.

Hazard Identified During the Investigation

Improper flaring technique.

Consequence

Aircraft bounced after landing and PIC lost control of the aircraft.

1. FACTUAL INFORMATION

1.1 HISTORY OF THE FLIGHT

Zlin 242L aircraft VT-IGM belonging to IGRUA was engaged in a solo training flight (Circuit and Landing Exercise) under the command of a Student Pilot at Fursatganj Airfield, Uttar Pradesh on 21Oct 2019.

On the day of accident, Student Pilot reported to akademi at 0700 Hrs IST. He underwent Breath Analyzer Test for alcohol at 0705 Hrs and test results were negative. The Student Pilot was planned for two Circuit & Landing (Solo) Flying exercise on the day of incident. The takeoff was planned for 1330 Hrs IST.

As per the schedule, the trainee pilot reported for the training exercise at 1300 Hrs IST. The trainee pilot accepted the aircraft with nil snag. The trainee pilot carried out walk around/preflight inspection. The preflight briefing to PIC was carried out by Flying Instructor (FI) which included weather, taxi – T/O pattern, circuit pattern, approach and landing. With AFI onboard, the trainee pilot performed six circuits and landings checks. Student Pilot was found fit by AFI and hence, the trainee was released for the second solo to carry out two circuits and landing by AFI under the supervision of CFI.

After obtaining necessary clearance from ATC, PIC took off at 1514 Hrs IST from runway 27 for Solo exercise. The takeoff was uneventful and no abnormality was reported by PIC. At 1000 ft AGL, PIC carried out “after takeoff checks”. Student Pilot leveled out the aircraft on crosswind at 1400 ft and maintaining speed of 90 to 100 Kts, turned for downwind and reported aircraft position to the ATC. ATC instructed VT-IGM to report on the finals.

On finals, at 900 ft altitude and at a speed of 80 knots, Student Pilot requested ATC for landing clearance. As per ATC Controller, approach was visually normal and the winds were calm and favorable (with reference to windsock & Local METAR).

During approach, the aircraft made an initial touchdown (first contact) only on left wheel and bounced. During the bounce, the aircraft was banking towards the left which made the left wing tip come in contact with the runway (2nd Contact). Once the aircraft was veering toward the left, the trainee pilot gave full power to initiate “go around”. Once again, the aircraft came in contact with the runway (3rd contact) with main wheels. The

aircraft again bounced and came into contact of the kutchra/soft ground (LH side of runway). The aircraft bounced again from that point.

Post bounce, the aircraft was on continuous full power and was veering towards left. The Student Pilot tried to control the aircraft and attempted to bring it back on runway, however, the aircraft was continuously veering towards the left and finally rested on the rain water drainage which was located approx. 180 ft from the runway edge and approx. 1067 ft from the runway edge light RS 128.

The Student Pilot noticed fire from the bottom of the canopy (rudder/brake pedal) and tried to extinguish it with cockpit fire extinguisher. Since the fire was spreading, Student Pilot jumped out of the aircraft.

Person manning ATC activated the siren, informed CFI and alerted the emergency services. Flight Instructor immediately rushed to the accident site. Rescue team evacuated PIC from the site. Student Pilot was taken to local hospital for medical checkup. Post crash landing, ELT got activated.

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

During crash site examination, damage assessment of aircraft was carried out and following were observed: -

- (a) Aircraft was completely burnt in the front section including the canopy, seat, instruments and displays.
- (b) Fire marks and cracks were present on the LH wing surface.
- (c) Propeller was found to be twisted with scratch marks. The propeller was found to be resting on the drain wall.
- (d) On the runway, broken pieces of left-wing navigation light were found.



Fig: Front view of the damaged aircraft

- (e) Both main landing gears were found intact with aircraft.
- (f) Engine and its cowling were found completely damaged due to fire.
- (g) Nose Landing gear was found intact with aircraft structure but broken.



Fig: Side view of Engine and Propeller

1.3 OTHER DAMAGES

Due to impact of the aircraft with the edge of monsoon drain, a small portion of the drain was damaged.



Fig: Damaged Monsoon Drain

1.5 PERSONNEL INFORMATION

1.5.1 Student Pilot

Pilot	: SPL Holder
Age	: 19 Years
Licence	: Valid SPL
Date of Issue	: 09/05/2019
Valid up to	: 08/05/2024
Category	: Aeroplane
Class	: Single Engine Land
Endorsement	: Zlin 242L
Date of Med. Exam.	: 06/08/2018

Med. Exam valid up to	: 05/08/2020
FRTO License.	: Valid
Date of issue	: 02/07/2019
Valid up to	: 01/07/2029
Total flying experience	: 21:25 Hrs.
Experience on type	: Zlin 242L (21:25Hrs)
Experience as PIC on type	: Zlin 242L (00:25Hrs)
Last flown on type	: Zlin 242L
Total flying experience during last 180 days	: 21:25 Hrs
Total flying experience during last 90 days	: 16:15 Hrs.
Total flying experience during last 30 days	: 04:20 Hrs
Total flying experience during last 07 Days	: 02:30 Hrs.
Total flying experience during last 48 Hours	: 00:00 Hrs.
Total flying experience during last 24 Hours	: 00:55 Hrs.

1.6 AIRCRAFT INFORMATION

1.6.1 General Description

The Zlin 242L Aircraft is designed for basic and advanced training, touring flights and aerobatics training. When equipped with appropriate optional equipment, it is suitable for night training, instrument flights, radio navigation flights, flight aerobatics and glider & banner towing.

The Zlin 242L is a low wing, single engine cantilever monoplane of all-metal structure, two-seat arrangement, with tricycle fixed landing gear with nose leg.

The power plant consists of the TEXTRON Lycoming AEIO-360-A1B6 piston engine and three-blade constant-speed hydraulically controlled MTV-9-B-C/C-188-18a or Hartzell HC-C3YR-4BF/FC 6890 propeller.

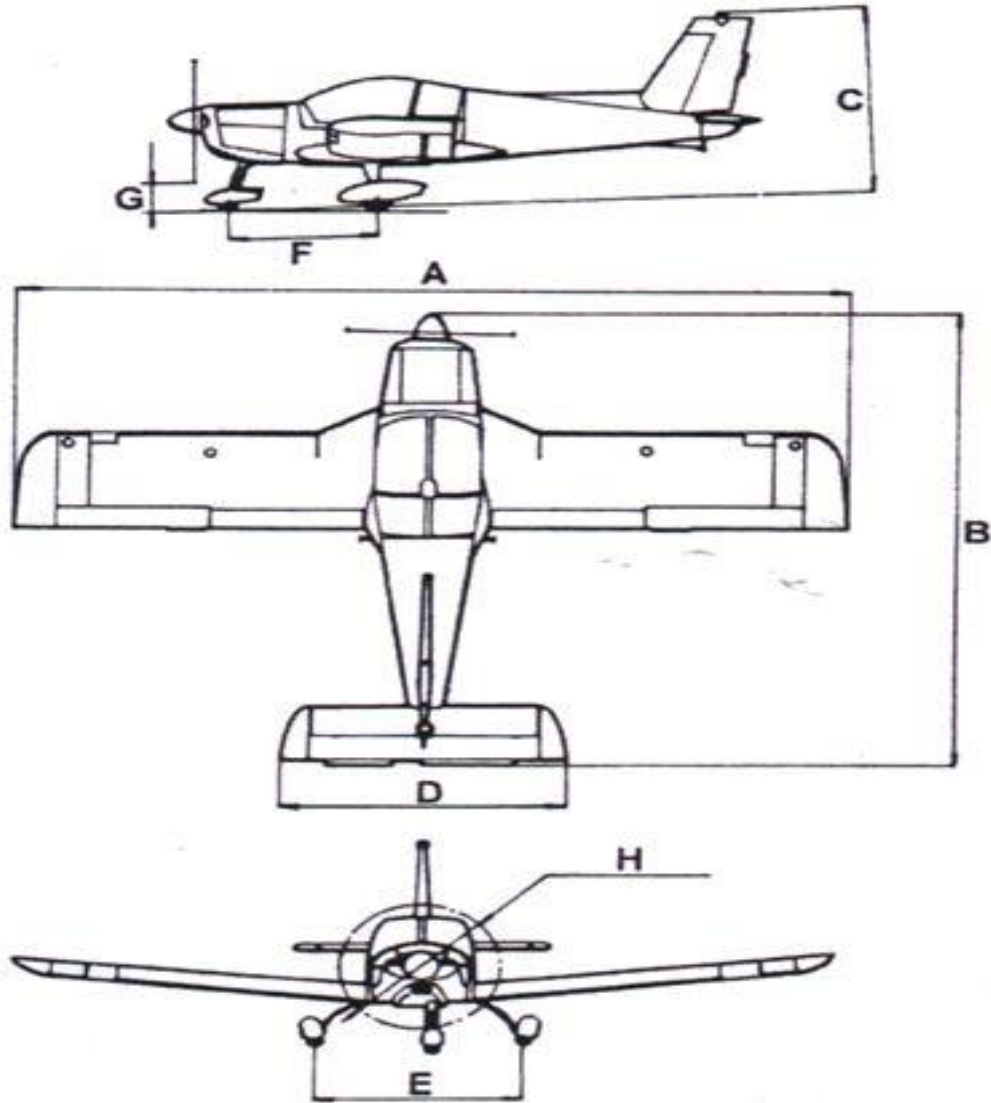


Fig: Three view drawing-Zlin242L aircraft

<u>Description</u>	<u>Dimension in</u>	
	<u>mtr</u>	<u>ft</u>
A	9.340	30.64
B	6.940	22.77
C	2.950	9.68
D	3.200	10.50
E	2.330	7.64
F	1.755	5.76
G with Hartzell HC-C3YR-4BF Propeller	380	1.24
H with Hartzell HC-C3YR-4BF Propeller	1.780	5.84

1.6.2 Aircraft Technical Information

Aircraft Model	: ZLIN 242L
Aircraft S. No.	: 0770
Year of Manufacturer	: 2005
Certificate of Registration (C of R) No.	: 3287
Certificate of Airworthiness (C of A) No.	: 2696/2
C of A Validity	: Valid at the time of accident
ARC issued on	: 19.03.2019
ARC valid up to	: 22.03.2020
Engine Type	: Lycoming – AEIO-360–A1B6
Engine Sl. No.	: L-32439-51A
Propeller Type	: Hartzell HC-C3YR-4BF/FC-6890
Propeller SL. No.	: CK5074B
Aircraft Empty Weight	: 816.30 Kgs
Maximum Take-Off weight	: 1090 Kgs
Date of Aircraft weighment	: 15.02.2019
Total Aircraft Hours	: 4920:35 Hrs
Engine Hours (Since New)	: 3559:25 EH
Engine Hours (Since Last Overhaul)	: 766:27 EH

The Aircraft was registered in “Normal” category & Sub Division - “Passenger Aircraft”. Certificate of Release to Service (CRS) was issued on 12.10.2019. The C of A was valid at the time of accident.

The Aircraft was holding a valid **Aero Mobile License No. A-095/022/RLO (NR)** at the time of accident. The Aero Mobile license was valid till 31st December 2019.

The aircraft was last weighed on 15/02/2019 at IGRUA and was duly approved by the office of Director of Airworthiness, DGCA, Delhi (NR). As per the approved weight schedule, the Empty Weight of the aircraft was 816.30 Kgs and Maximum Take-Off Weight (MTOW) of the aircraft was 1090 Kgs. Maximum payload with fuel tanks full is 153.7 Kgs. Empty weight CG was 0.685 mtr aft of datum (Front face of firewall). As the MTOW of the aircraft was below 2000 Kgs, there was no requirement as per Civil

Aviation Requirement (CAR Section 2, Series 'X', Part II, Para 4) for re-weighing of the aircraft on periodic basis. Load & Trim sheet was prepared for the sortie.

Aircraft had logged 4920:35 hours till the date of accident. Last scheduled inspection (50 Hrs/3 Months) was carried out on the aircraft at 4910:11 Hrs airframe hours (TSN) on 24 Sep 2019. The aircraft had logged 10:24 Hrs since it's last scheduled inspection. Pre-flight inspection on the aircraft was carried out by the Student Pilot before the first flight on the day of accident.

As on the date of accident, the aircraft engine had logged 3559:25 Hrs (TSN). Last scheduled inspection carried out on the engine was (50 Hrs/3 Months) inspection at 756:03 engine Hours (TSO) on 24 Sep 2019.

Last scheduled inspection carried out on the propeller was 50 Hrs/3 Month inspection at 357:52 Hours (TSO) on 24 Sep 2019.

As per the log book, only engine oil was changed on 24 Sep 2019 as mentioned in the last replacements, major repairs and overhaul records section and no major repair or any other unscheduled maintenance activity was carried out on the aircraft. After change of engine oil, aircraft was given ground run which was found satisfactory.

1.7 METROLOGICAL INFORMATION

Indian Metrological Department (IMD) office is situated at Fursatganj Airfield. Updated weather of Fursatganj Airfield is always available on IGRUA website which can be utilized by crew. Wind sock is also available at Fursatganj Airfield. During landing phase, VT-IGM was informed about Wind for runway 27.

As per the METAR issued for IGRUA, following meteorological conditions existed at 0901 UTC.

Time in UTC	Wind Direction	Speed (Knots)	Vis (m)	Clouds	Temp (°C)	Dew Point	Trend	QNH
0900	290	08	3500	SCT 10000' FEW 3000'	31	18	---	1009

1.8 AIDS TO NAVIGATION

Following Navigational Aids are available at IGRUA (Fursatganj Airfield).

- (a) PAPI on both runway
- (b) VOR/DME
- (c) Localiser
- (d) Wind Shock

In addition to this, CFI and other concerned operational personnel monitor operations through handheld radio sets whenever flying is in progress.

1.9 COMMUNICATION

The aircraft was fitted with VHF radio set which catered for communication while flying. During circuit flying, student pilot was in two-way positive communication with local ATC, manned by IGRUA personnel. However, no recording facility is available at Fursatganj ATC.

1.10 AERODROME INFORMATION

This aerodrome is owned and maintained by IGRUA. The entire runway surface is paved. Rwy 27 is Precision Instrument Approach runway and Rwy 09 is non Precision Instrument Approach Runway.

Runway Orientation	09/27
Length	1722 mtr (5600 ft)
Width	45 mtr (150) ft
Elevation	359 ft
ARP	26° 14' 57" N 81° 22' 54" E
ATC Tower Facility	ATC tower has VHF radio installed. Qualified officials carry on ATC responsibilities.

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 AND IMPACT INFORMATION



Fig: Aircraft Final Rest Position

The initial impact mark observed on the runway was of the LH wing tip and the marks were found turning towards left. The mark on the runway were at a distance of 30 ft from the runway centerline and continued for a distance of 15 ft. Further, scratch marks of balance mount of LH wing were also noticed on the runway.

Presence of Broken LH wing Navigational Light

The broken pieces of LH wing navigational light (Red) was available at a distance of 41.9 ft from the RWY centerline.

Tyre Marks

The LH & RH Main Wheel tyre marks of 28 feet and 26 feet were observed on the left side of runway centerline respectively which indicated continuous veering of aircraft towards the left.



Wing Tip Scratch Marks on Runway



MLG Tyre marks on Runway

Aircraft Final Position

The aircraft finally rested at a distance of 1067 ft in the longitudinal direction from runway edge light No. RS128 and 180 ft approx. on the LH side of the runway edge line where the drain is located. The elevator was found in down position and the rudder was tilted to the left.



Fig: Final Rest position and damages on VT-IGM

1.13 MEDICAL & PATHOLOGICAL INFORMATION

The Student Pilot underwent Breath Analyzer test at 0708 Hrs IST before operating the first flight of the day. As per the report, Breath Analyzer test was negative.

Post accident, medical examination of student pilot was carried out by IGRUA medical officer and declared fit & free of any injury.

1.14 FIRE

Once aircraft finally rested on the drain, the Student Pilot noticed fire from the lower region of canopy (Near Rudder Pedals). He tried to extinguish the fire with the help of handheld fire extinguisher present in the aircraft. As, the fire started spreading, Student Pilot jumped out of the aircraft.

The airport fire services were used to control the fire. By the time fire was controlled, most part of the aircraft was burnt.

1.15 SURVIVAL ASPECT

The accident was survivable.

1.16 TEST & RESEARCH

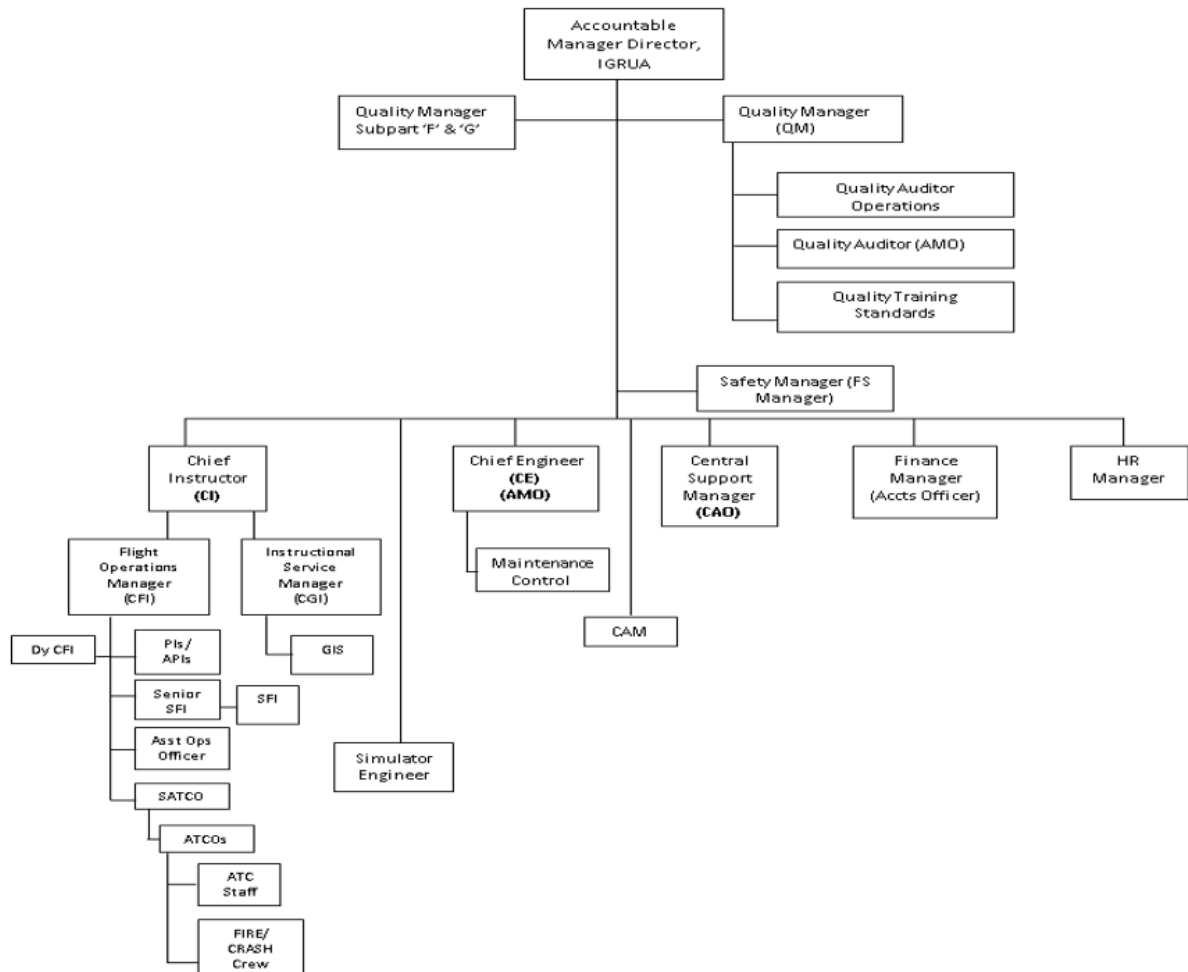
The video record available with the operator at the landing location has clearly captured the flight profile with initial touchdown and subsequent bounces till the time of entering into runway side strip. However, subsequent movement of the aircraft on the ground area has not been recorded due to shadow area of camera.

1.17 ORGANIZATION AND MANAGEMENT INFORMATION

Indira Gandhi Rashtriya Uran Akademi (IGRUA) is a flying training Organization located at Fursatganj, Dist. Raebareli U.P. It was set up in 1985 as an autonomous body under the Ministry of Civil Aviation through its governing council being the supreme body of the organization headed by the secretary to the Ministry of Civil Aviation as the ex-officio Chairman. The chief executive of the organization is the Director who is the Accountable Manager having both the administrative and financial control in the organization. The flying training operations at IGRUA commenced in Oct 1986.

IGRUA has Flight Simulators and Audio Visual Training Aids to impart Ground and Flying training.

IGRUA is approved by DGCA as a Flying Training Organization (FTO) as per CAR Section-7, Series D, Part-I.



Organizational Chart of IGRUA

The IGRUA is having its own fully established Aircraft Maintenance Organization approved as per CAR-M Sub Part-F to cover the maintenance of aircraft, engine, Instruments and battery installed on the aircraft. IGRUA also has the approval for Continuing Airworthiness Management Organization under CAR-M, Sub Part-G.

The following courses are presently offered at IGRUA on fixed wing Aircraft:

- (a) Pilot License: Commercial (Airplane Single engine Land) and Airplane Multi-Engine Land)
- (b) Assistant Flight Instructor Rating
- (c) Flight Instructor Rating
- (d) Instrument Rating
- (e) Multi-Engine Endorsement Training (DA-42)

1.18 ADDITIONAL INFORMATION

1.18.1 Stall Warning System & Recovery

Extract from TPM of IGRUA

Stall is a potentially hazardous manoeuvre involving loss of height and loss of control. A pilot must have adequate knowledge about how to recover from a stall and he/she must be able to clearly and unmistakably identify an impending stall so that it can be prevented.

As there is no Angle of Attack indicator in the aircraft, (theoretical and) Practical knowledge of aircraft stalling characteristics is mandatory under all conditions of flight.

Symptoms of stall: -

- Reduced control effectiveness
- An aural stall warning
- Aerodynamic buffet

During Air Exercise

Stalling is practiced during general handling sorties to familiarize trainee with low speed handling characteristics of the aircraft to recognize the symptoms of approach of a stall in its early stages and to recover safely and quickly with min loss of height.

Pre Maneuver Checks

- Height sufficient (2300' AGL for DA-40, ZLIN and TB-20 and 3000' AGL)
- Area clear of populated townships, large water bodies.
- Cockpit checks-Seat belts fastened, large loose articles secured, engine instruments normal, Fuel pump on.
- Look out turns 90° X 2 or 180° X 1 (Look out for any birds, clouds or other Aeroplanes)

Internal Checks

Seatbelt: FASTENED

Engine instruments: CHECK

Loose items: SECURED

Fuel Pump: ON

External Checks

Left, front, right: Area clear

Point of reference: Identify

Point of orientation: Identify

Reference Altitude: Maintain

Reference Heading: Maintain

Post Maneuver Checks

Re-orient (Within sector boundaries)

Engine parameters check

Fuel pump off

Symptoms of an approach to a stall and the aircraft behavior during a stall

- Point the aircraft in a clear direction, pick up a point straight ahead and from level flight, smoothly close throttle. Apply left rudder to maintain direction. As the speed reduces, progressively raise the nose to maintain height. Stall warning, aircraft judders and even with the stick held back, the nose drops- This is a stall.

- This is because the wings had reached the critical angle of attack and were not generating sufficient lift to support the weight of the aircraft. Therefore, to unstall the aircraft we must reduce the angle of attack by easing the stick forward and simultaneously open full throttle to minimize the height loss.

Stall in clean configuration-Recovery without Power (Nonstandard method of recovery)

- Point the aircraft in a clear direction, pick up a point straight ahead and from level flight, smoothly close throttle. Apply left rudder to maintain direction. As the speed reduces, progressively raise the nose to maintain height. Stall warning, aircraft judders and even with the stick held back, the nose drops.
- We will unstall the aircraft by easing the stick forward, notice the dive angle/attitude as speed increases aircraft unstalls now ease out of the dive to recovery attitude. Notice the height loss (approx 300 ft), open full throttle and climb back to the original height.

Stall in clean configuration-Recovery with Power (Standard method of recovery)

- Point the aircraft in a clear direction, pick up a point straight ahead and from level flight, smoothly close throttle. Apply left rudder to maintain direction. As the speed reduces, progressively raise the nose to maintain height. Stall warning, aircraft judders and even with the stick held back, the nose drops.
- We will unstall the aircraft by easing the stick forward, rudder as required & throttle fully forward. Notice the height loss (approx 150ft), open full throttle and climb back to the original height.

Stall in landing configuration & recovery

- Point the aircraft in a clear direction, pick up a point straight ahead and from level flight, we will simulate downwind, base and finals in one single leg, carry out approach and landing checks, smoothly close throttle. Apply left rudder to maintain direction. As the speed reduces, progressively raise the nose to maintain height. Stall warning, aircraft judders and even with the stick held back, the nose drops.

- We will unstall the aircraft by easing the stick forward, rudder as required & open full throttle and climb back to the original height, at appropriate speed retract undercarriage/flaps.

Stall showing wing drop & recovery

- During the stall a wing may drop at the point of stall. This may be due to some inherent characteristics of the aircraft or faulty flying technique. To recover from stall if the wing drops, you must never use aileron to pick up a dropped wing. This will only aggravate the situation.
- The correct method of recovery is to apply sufficient opposite rudder to prevent any further yaw, at the same time adopting the standard method of recovery. Once the aircraft has unstalled, use ailerons to get wings level, neutralize the rudders and ease out of the dive (Rudder Stick Throttle). Open full throttle and climb back to the original height.

Faults

- Insufficient / delayed easing of Stick forward at the point of Stall.
- Lifting of dropped wing with aileron.
- Delayed opening of throttle.
- Premature / delayed recovery from dive.
- Incorrect rate of pull-out from dive.

Points of Airmanship

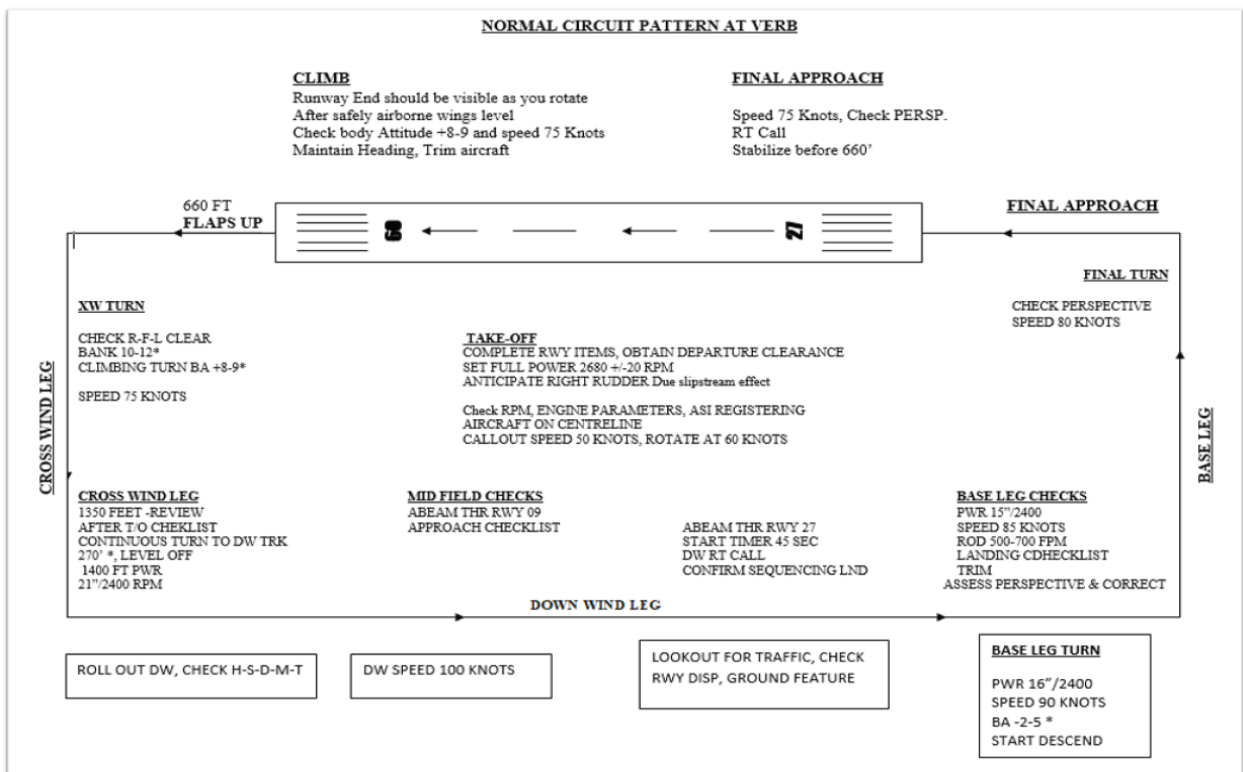
- Never use aileron to pick up a dropped wing at the point of stall. This would aggravate the situation. Use opposite rudder to prevent further yaw. Ailerons to get wings level must be used only after speed increases.
- While positioning for stall, ensure that a/c does not go out of sector during stall and recovery.
- Look around and orientate after each stall.
- Do not forget to perform the post flight checks.

Points of Engine Handling

- Engine parameters should be checked before and after each stall.
- Throttle operation must be smooth.
- Check fuel imbalance.

1.18.2 Circuit Pattern

Circuit pattern in respect of runway 27 tailored by IGRUA wherein procedures for all the legs are clearly defined.



Circuit Pattern

The circuit pattern flown at Fursatganj is left hand pattern for both the runways which means that all turns are made to the left. The circuit can be divided into two sides namely the 'live side' and the 'dead side'. The 'live side' is that side where aircraft flying in sequence along the downwind leg to the final approach for landing. Aircraft joining the circuit from above the airfield will descend only on the 'dead side' before fitting themselves into the pattern.

Air Exercise

Upwind Leg

The upwind leg requires you to maintain the runway heading (winds corrections as required) and carry out after takeoff checks before you turn onto the crosswind leg (700ft AGL).

Crosswind Leg

The climbing turn from the initial climb onto the crosswind leg is usually started at 700 ft AGL. The turn is carried out with 10° angle of bank and climb speed. The aircraft is leveled out at the circuit height of 1000 ft AGL and the throttle reduced to maintain the cruise speed. The direction to roll out on the crosswind is such that you fly on a direction that is opposite to the direction of the runway you took off from. Having attained the correct lateral displacement from the runway a roll out is carried out onto downwind.

Downwind Leg

The purpose of the downwind leg is to provide the pilot an opportunity to prepare for landing. It is here that the aircraft configuration, position, height and speed are set ready to begin the final approach to land. It is vital to fly the downwind leg with the aircraft in the correct position in relation on the runway and get ready to execute a turn onto the base leg. The correct lateral spacing at the correct height is confirmed, when the wings are level, by visually checking that the runway appears at correct displacement. Carry out Approach Checks.

The heading will need to be adjusted, to overcome the effect of wind at circuit height, to be able to track parallel to the runway. Even if at ground level the wind is straight down the runway, at circuit height there may be a crosswind on the downwind leg. Look ahead along the track to select ground features to aid tracking. Commence a turn onto the base leg when runway is 45° (Approx 7 to 8 O'clock).

Base Leg

The base leg is flown 90° to the runway heading and requires you to perform the Landing Checks as soon as you roll out on the base leg. Pick up a ground feature to

assist in rolling out. Adequate offset is to be given so as to cater for the winds and fly the desired path along the ground.

Final Turn

At the end of the base leg, a descending turn onto final is commenced so as to roll out along the final approach heading. An appropriate angle of bank not exceeding 20°, adjusted for the wind conditions, must be used in the turn to achieve this position. Trim is maintained throughout this turn and it is vital to monitor both the speed and attitude during the turn to avoid any chance of stalling inadvertently. An accurately flown final turn will place the aircraft at the ideal point from where the final approach is started.

Final Approach

The final approach down to the landing should follow a safe path at a constant, acceptable angle of descent. A final approach starting from correct positioning over the top of the runway will give an acceptable angle and a safe approach, if this angle is maintained down to touchdown. The apparent shape of the runway as seen from the top of the final can be used to assess whether the approach is correct and at an acceptable descent angle.

As per the procedure, at 300' AGL, after checking that aircraft is in the landing configuration a callout must be given saying, "Approach Stabilized, Going for Landing". And if, by any chance aircraft is not stabilized before 300' AGL, PIC must open full power and Go Around. (Trainee must be taught and demonstrated the go around procedure in the initial circuit and landing stage).

Faults

- Do the checks and procedures thoroughly at all points in a circuit.
- Keep an eye on your displacement from the runway.
- Monitor the RT and the traffic properly.
- Maintain the correct speeds in all legs of the circuit.
- Identify the correct ground feature.

1.19 USEFUL OR EFFECTIVE INVESTIGATION TECHNIQUES

NIL

2. ANALYSIS

2.1 SERVICEABILITY OF AIRCRAFT

The aircraft VT-IGM had valid C of A and CRS at the time of accident. The last scheduled inspection was carried on 24.09.2019 at 4910:11hrs TSN. At the time of accident, Aircraft had flown 10:24 Hrs since its last servicing. The weight of the aircraft at the time of take-off was 950.4 Kgs against the MTOW of 1090Kgs. The CG was within limits. The load & Trim sheet was prepared by the Student Pilot before the first sortie of the day.

The aircraft was fitted with piston engine bearing S/No. L-32439-51A which had done a total of 3559:25 Hrs since new and 766:27 Hrs since it's last overhaul. Pre-flight inspection was carried out by the Student Pilot. CRS for the aircraft after its last maintenance was issued by company authorized AME. No DGCA mandatory modification was due on this aircraft at the time of accident.

So, the serviceability of aircraft was not an issue and therefore the maintenance factor can be ruled out in the accident.

2.2 WEATHER

The weather information provided to Student Pilot by ATC for the sortie was above the minima. Further, no variation in the weather condition, deterioration and abrupt changes were forecasted by the METAR. ***Hence, weather is not considered a factor in this accident.***

2.3 OPERATIONAL ASPECTS

On the day of accident, Student Pilot was authorised by the CFI for 2nd solo circuit and landing exercise on aircraft VT-IGM. The Flight Instructor had given preflight briefing to student pilot which included Taxi, Takeoff pattern, Circuit pattern, approach and landing on runway 27. Before commencing the first sortie of the day, Student Pilot completed the preflight inspection on VT-IGM. After carrying out checks, Student Pilot obtained taxi clearance from the ATC and was cleared for line up on R/W 27. All parameters were checked and were found to be in normal operating range after start up. Weather was above the minima.

Aircraft took off from R/W 27 for circuit and landing exercise and carried out 6 sorties uneventfully. The AFI cleared trainee for 2nd solo circuit and landing exercise. Student Pilot lined up on runway 27. After takeoff, aircraft parameters were reported to be normal to IGRUA ATC.

After attaining an altitude of 860 feet, Student Pilot retracted flaps and aircraft speed was maintained at 78 knots. When the aircraft was at 1000 feet and 2.2 DME, Student Pilot joined crosswind leg after initiating a left turn. Aircraft was levelled out at an altitude of 1400 feet. Student pilot continued maintaining 1400 feet, speed 90-100 knots, direction 090, MAP 21 inches and trimmed the aircraft for level flight after joining the downwind leg.

As per the "Circuit Procedure", while the aircraft was at dead dumbbell 09, Student Pilot prepared for approach check. Simultaneously, as per the SOP, aircraft fuel pump was switched 'ON' and fuel selector position was changed. When the aircraft was abeam live dumbbell 27, Student Pilot communicated aircraft position to ATC.

Post completion of downwind leg, Student Pilot had reduced the throttle to maintain a speed of 85 knots. However, during base leg, Student Pilot had changed the power to 18-19' inches of MAP and subsequently rolled for joining final leg.

As per the statement of trainee pilot, during final approach, RT call was given to ATC for landing clearance. The aircraft speed was continuously maintained at 80 knots and with the help of minor correction of ailerons, aircraft was aligned with centreline and simultaneously PAPI was followed for correct glide slope.

Aircraft was high on approach at short finals. Student Pilot had reduced the power to Idle and while the aircraft was at a height of 15 to 20 feet above AGL, aircraft started flaring, however, suddenly the left wing of the aircraft dropped. The aircraft bounced at touchdown and subsequently, Student Pilot opened full power to initiate a "go around". Since the aircraft was low on height and due to left bank, tip of the left wing of the aircraft struck runway. Thereafter, Student Pilot lost control of the aircraft.

Aircraft left the runway and touched down on soft ground and started drifting towards the left. After travelling a distance of 1067 feet, aircraft nose hit the edge of monsoon drain, wherein nose of the aircraft acted as pivot resulting into change of

aircraft heading. The aircraft nose wheel went inside the drain and aircraft came to a halt in a nose down attitude. Subsequently, aircraft caught fire.

From the above, it is evident that pilot handling is a contributory factor to the accident.

2.4 CIRCUMSTANCES LEADING TO THE ACCIDENT

After completion of six uneventful circuit and landing exercises, aircraft took off from runway 27 for the 2nd solo circuit and landing exercise. Take off and climb were reported to be normal and aircraft joined the crosswind leg. Till the base leg, no abnormality was reported and the aircraft joined the final approach leg. While the aircraft was on short finals, student pilot selected Idle power. During short final, aircraft was high on approach.

In addition, aircraft missed the touchdown zone and was 40 to 50 feet above the runway at second touchdown point. **During flaring, aircraft entered into stall condition resulting into sudden drop of left wing and bounced after touchdown.** Student Pilot initiated a “go-around” after first bounce which further aggravated the situation as the aircraft was low on altitude and a slight bank to the left resulted into left wing tip striking the runway. Student Pilot lost control of the aircraft. Aircraft left the runway and landed on soft ground on left of runway.

Finally, aircraft came to a halt after hitting on drain edge near the boundary fencing in nose down attitude.

3. CONCLUSION

3.1 FINDINGS

- (i) The student held valid SPL and was authorized for the flight by CFI.
- (ii) The aircraft was airworthy at the time of occurrence.
- (iii) Visibility was above the minima and wind was 290° / 08 knots which was recorded at 0900 Hrs IST.
- (iv) Student Pilot had already completed six circuit & landing sorties on the same aircraft on the day of occurrence before operating 2nd solo flight.

- (v) Before operating the flight, Student Pilot had undergone preflight breath analyser examination and result was negative.
- (vi) Aircraft Pre-flight inspection was done by the Student Pilot under the supervision of API before the first sortie of the day.
- (vii) Tech log was not filled before operating the flight and hence no record of the flight was available with the institute which is a violation as per DGCA guidelines.
- (viii) Flight Instructor had given preflight briefing which included Taxi, Takeoff pattern, Circuit pattern, approach and landing on runway 27.
- (ix) At short finals, aircraft was high on approach. At threshold, aircraft was 50 feet above AGL.
- (x) While the aircraft was flaring, aircraft entered stall, left wing dropped resulting into lift loss and aircraft bounced on first touchdown on runway 27.
- (xi) Student Pilot opened “full power” to initiate a go-around. As the aircraft was low on altitude, left wing tip struck the runway and thereafter aircraft simultaneously yawed and banked towards left. Thereafter, Student Pilot lost control on the aircraft.
- (xii) The first impact was at **1300 feet** away from the threshold runway 27 and approx. 30 feet from the runway centerline.
- (xiii) The damage on Propeller indicated that engine was on full power when aircraft nose impacted the monsoon drain.
- (xiv) The final rest position of aircraft was around 2360 feet from end of runway 27 and 160 feet from the edge of runway.
- (xv) Aircraft was completely damaged due to post impact fire. However, Student Pilot sustained nil injuries.

3.2 PROBABLE CAUSE OF THE ACCIDENT

Aircraft was high on approach while landing, during flaring aircraft entered into stall due to which aircraft suddenly lost height, thereafter, improper corrective measure to recover the aircraft from bounce, resulted into the accident.

4. SAFETY RECOMMENDATIONS

- (i) As the accident occurred due to improper landing technique by the Student Pilot, therefore, suitable corrective training shall be imparted to Student Pilot before releasing for flying.
- (ii) All Flying Training Institutes shall give more emphasis on enhancement of training in respect of unstabilised approach and recovery techniques during critical phase of landing including the go-around procedures on immediate basis to prevent any such recurrence.
- (iii) DGCA may review the training syllabus of all training institutes/Flying clubs on recovery of aircraft from stall at low altitude.



(Dinesh Kumar)

Investigator



(Anil Tewari)

Investigator-in-Charge

Date: 13 Feb 2020

Place: New Delhi