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Final Investigation Report
on
Accident to M/S Government Aviation Training Institute,
Cessna 152 Aircraft, VT-EUW
on 06 June 2022

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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/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.

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GLOSSARY

AAIB	Aircraft Accident Investigation Bureau
AD	Airworthiness Directives
AFIR	Assistant Flight Instructor Rating
AME	Aircraft Maintenance Engineer
AMM	Aircraft Maintenance Manual
AMM	Aircraft Maintenance Manager
AMP	Aircraft Maintenance Program
AMSL	Above Mean Sea Level
ARC	Airworthiness Review Certificate
ATC	Air Traffic Control
BA	Breath Analyzer
BAL	Birasal Aerodrome Limited
BHP	Brake Horse Power
C of A	Certificate of Airworthiness
C of R	Certificate of Registration
C.R.S	Certificate for release to service
CAME	Continuing Airworthiness Management Exposition
CAR	Civil Aviation Requirements
CFI	Chief Flight Instructor
CFT	Crash Fire Tender
CG	Centre of Gravity
CI	Chief Instructor
CL (C/L)	Circuits and Landing
CPL	Commercial Pilot License
CVR	Cockpit Voice Recorder
DDG	Deputy Director General
DFDR	Digital Flight Data Recorder
DGCA	Directorate General of Civil Aviation
Dy. CFI	Dy. Chief Flight Instructor
ELT	Emergency Locator Transmitters
FIR	Flight Information Regions
FOD	Foreign Object Debris
FRTOL (R)	Flight Radio Telephone Operator License (Restricted)
FT	Feet
FTO	Flying Training Organizations
FTPR	Flight Training Progress Report
GATI	Government Aviation Training Institute
GF	General Flying
HP	Horsepower
Hrs	Hours
ICAO	International Civil Aviation Organization
IIC	Investigator –In –Charge
IR	Instrument Rating
Kg	Kilogram
KT	Knots
LFA	Local Flying Area
LH	Left Hand

LL	Low Lead
M	Meter
MET	Meteorological Service
METAR	Meteorological Aerodrome Report
MLG	Main Landing Gear
MOM	Maintenance Organization Manual
MHz	Mega Hertz
MTOW	Maximum Take-off Weight
N/A	Not Available
NLG	Nose Landing Gear
NM	Nautical Miles
O/H	Overhaul
OJT	On-the-Job-Training
POH	Pilot's Operating Handbook
PPL	Private Pilot License
QNH	Nautical Height
RH	Right Hand
RPM	Revolutions Per Minute
RT	Radio Telephony
RTO	Rejected Take-Off
SB	Service Bulletin
SOP	Standard Operating Procedure
SPL	Student Pilot License
TPM	Training Procedure Manual
TRI	Type Rating Instructor
TSN	Time Since New
TSO	Time Since Overhaul
UTC	Coordinated Universal Time
VFR	Visual Flight Rules
VHF	Very High Frequency
VMC	Visual Metrological Conditions

Aircraft and Accident details of Cessna 152 Aircraft VT-EUW on 06 June 2022			
1	Aircraft	Type	Cessna 152
		Nationality	Indian
		Registration	VT – EUW
2	Owner		Govt. of Odisha
3	Operator		M/s Govt. Aviation Training Institute
4	Pilot – in –Command		SPL holder
	Extent of injuries		Minor
6	Passengers on Board		Nil
7	Place of Accident		Birasal Airfield
8	Date & Time of Accident		06 June 2022 & 0741UTC (approx)
9	Last point of Departure		Birasal Airfield
10	Point of intended landing		Birasal Airfield
11	Latitude/Longitude of accident site		Lat: 20°59'00.65" N
			Long: 85°.40'44.48" E
12	Type of operation		Solo Circuit and Landing Training Sortie
13	Phase of Operation		Take-off roll
14	Type of Accident		Runway Excursion

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

SYNOPSIS

On 06 Jun 2022, a Cessna aircraft VT-EUW belonging to M/s Government Aviation Training Institute (GATI), Birasal, Odisha, while carrying out a solo circuit and landing, flying sortie met with an accident on take-off roll, at Birasal aerodrome at approximately 0741 UTC.

The aircraft was under the command of a trainee pilot holding a valid student pilot license. As per training schedule, trainee pilot did the preflight inspection and no abnormality was observed. After completion of the pre-flight inspection, trainee Pilot boarded the aircraft and started the aircraft's engine with ATC permission. The aircraft then taxied towards the runway holding point. Trainee pilot did all vital checks. All checks were satisfactory except for rudder pedal movement. Trainee pilot felt rudder pedal movement little sluggish. As no snag was observed in the aircraft's previous dual sortie, the trainee pilot ignored his own observation. Subsequently, the aircraft lined up on the assigned runway 27. Trainee pilot started take-off roll with gradual power and slight right rudder input. During take-off roll on approaching 50 KT, the aircraft started veering towards left. Trainee pilot applied opposite rudder. However, the aircraft kept on veering towards left and exited the runway. After impact with drain cover of water drainage line, aircraft came to rest. The Trainee pilot suffered minor injuries. However, the aircraft sustained substantial damages.

Director General, Aircraft Accident Investigation Bureau vide order No. INV.11011/9/2022-AAIB dated 13 June 2022 nominated Shri Amit Kumar, Safety Investigation Officer, AAIB as Investigator-In-Charge (IIC) to investigate and determine the probable cause(s) and contributory factor(s) leading to the accident. Later Shri Ravi Ramakrishnan, Consultant, AAIB was assigned on OJT.

Unless otherwise indicated, recommendations in this report are addressed to the regulatory authorities of the State having the responsibility for the matters with which the recommendation is concerned. It is for those authorities to decide what action is taken.

1. FACTUAL INFORMATION

1.1 History of the flight

On 06 Jun 2022, as per M/s GATI's daily flying training schedule, aircraft VT-EUW was planned for two solo circuit and landing (CL) sorties, three dual circuits and Landing (CL) sorties and one General Flying (GF) sortie. As per prevailing organization's practice, the Daily Pre-Flight Inspection was carried out by a Flying Instructor (pilot), holding a Limited Certification Authorization, issued by M/s GATI's Aircraft Maintenance Manager. During daily pre-flight Inspection no abnormality was observed. Post inspection, a dual Circuit and Landing sortie of 50 minutes with 03 landings was carried out on the aircraft. No abnormality was observed and the sortie was uneventful.

On the day, the trainee pilot was scheduled to operate a solo Circuit & Landing (CL) training sortie on the aircraft VT-EUW. According to plan, trainee pilot reported to the academy and at 0530 UTC, pre-flight Breath Analyzer (BA) test was conducted and the result was satisfactory. Instructor briefed the trainee pilot for Solo Circuit & Landing and released the trainee pilot with instruction to carry out total 04 circuits with 02 intentional go-around and 02 landings. Then the trainee pilot did the preflight inspection and no abnormality was observed. Trainee pilot prepared the load and trim sheet for the sortie and the flight instructor verified the same after checking. Subsequently, trainee pilot went inside the aircraft and made a request to ATC Birasal for engine start up. After obtaining ATC permission, aircraft's engine was started. Trainee pilot followed the checklist and taxi the aircraft towards the holding point runway 27. As per trainee pilot's statement, before entering runway 27, flight controls and instruments were checked. During flight control check, no abnormality was observed except for rudder peddle movement. As per trainee pilot's statement, rudder pedal feel was seems unusual. The trainee pilot was well aware of the fact that the aircraft had operated a dual CL sortie just half an hour before this sortie and no snag was reported by the previous crew. Therefore, the trainee pilot negated the observation on the rudder pedal movement and continued the sortie.

Aircraft lined up on runway 27 and trainee pilot carried out the before take-off vital checks. After completing checks, the trainee pilot opened the engine power gradually with a small right rudder input. As right rudder input is required for keeping the aircraft on the centerline in case of a clockwise rotating single engine propeller powered aircraft. Aircraft started rolling and as the speed approached to 50 KT, aircraft lost its directional control and started veering towards left and right. The trainee pilot observed a loss of control over the aircraft. Trainee pilot applied the opposite rudder to keep the aircraft on the centerline. However, the aircraft kept on veering towards left. At approximately 55KT, the trainee pilot aborted the take-off and applied the brakes to slow down the aircraft. The aircraft did not stop and kept on veering towards left at a speed. The trainee pilot put the throttle at IDLE in an attempt to slow down the aircraft speed, but the aircraft did not stop.

As per statement of Deputy CFI, he along with few flying instructors were standing near the under construction ATC building to observe the landings of the solo flying aircraft. They

witnessed the aircraft's lining up on the runway. While they were engaged in conversation, Dy.CFI heard twice the engine sounds, first time when the power was opened and second time, when the power was chopped. When the engine power was chopped, they all looked towards the runway 27 and witnessed the aircraft movement. The aircraft exited runway from left edge and went into unpaved surface. First the Nose landing gear hit the drain cover of the water drainage line passing parallel at approximately 33m away from runway centerline. Then both MLG hit the drain cover one by one. Due to sudden impact aircraft jumped the water drainage line. Subsequently, aircraft speed reduced and finally the aircraft came to rest almost opposite of ATC building (under construction).

Deputy CFI and two other flying instructors rushed towards the aircraft. ATC personnel also came out of the ATC cabin and shouted for fire tender. By the time, the trainee pilot had come out of the aircraft with own efforts. Subsequently, Deputy CFI and two flying instructors reached the aircraft. As per Deputy CFI statement, after reaching the aircraft, first he assessed the trainee pilot's condition and then turned off the Masters and ignition. He also removed the key and put the mixture to idle on observing fuel leak from the RH wing. Meanwhile, fire tender, ambulance and other student also reached the accident site. Deputy CFI advised one of the instructors to turn off fuel shut off valve and to remove the aircraft documents. Subsequently, trainee pilot was sent to the hospital for medical examination.

The Trainee pilot suffered minor injuries. Aircraft sustained substantial damages. There was no fire.

1.2 Injuries to persons

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

1.3 Damage to aircraft

The aircraft sustained substantial damage during the accident. The front fuselage and the nose section of the aircraft were found severely damaged. The damages sustained by the aircraft are given in the section 1.12.

1.4 Other damage

Three concrete drain covers used to cover the water drainage line got damaged due to aircraft impact.

1.5 Personnel Information

1.5.1 Trainee Pilot

Nationality	Indian
Age	24 yrs
License & Validity	SPL & 09.12.2026
Category	Aeroplane
FRTTO License Date of Issue/ Validity	31.01.2022/ 30.01.2032

Date of Med. Exam & validity	13.08.2021/ 17.08.2022
Total flying experience	32.00 hrs
Total Experience on type	32.00 hrs
Total Experience Solo on type	03.05 hrs
Last flown on type	04 June 2022
Rest period before the flight	17:55 hrs
Total Flying experience during last one year	32:00 hrs
Total Flying experience during last Six Months	32:00 hrs
Total Flying experience during last 30 days	03:40 hrs
Total Flying experience during last 7 days	02:35 hrs
Accident /Incident History	Nil
Date of last periodical assessment	09 May 2022

Student flying history

Trainee pilot had joined M/s GATI, Birasal under CPL course. As per FTPR, first air exercise of 45 min was done on 10 Dec 2021. On 11 Dec 2021, during second sortie instructor had demonstrated slipstream. On 03 Jan 2022, one of the instructors had made a remark in the FTPR as '*taxi- average tendency to go left*'. After the trainee pilot had completed 06:55 hrs of flying, FRTOL (R) was issued by the DGCA on 31 Jan 2022. Some relevant remarks made by the instructors in trainee pilot's FTPR are as tabulated below:

S. no	Sortie	Instructor's remarks in FTPR
1.	G/F	Tendency to be on left side
2.	C/L	Prompted to maintain centerline on Take-off roll Approach high, Alignment left
3.	C/L	Prompted for centerline correction on Take-off roll Approach high, Alignment left
4.	C/L	Advised to ease rudder pressure during Take-off Approach high correction slow, alignment left, assisted for correction

As per FTPR, on various occasion trainee pilot's alignment was found to be left. Trainee pilot had received one demonstration regarding engine failure during take (akin to the aborted/rejected take-off) emergency during CL practice. However, there is no record of practicing the same (aborted/rejected take-off). Trainee pilot was released for first solo on 29 April 2022, after completion of 23:10hrs of flying training. Subsequently, trainee pilot had practiced four solo circuit and landing. Brief of for solo checks flying hours and subsequent solo flying hours are as tabulated below:

Date	Exercise	Check Flying	Solo Flying
29.04.2022	1st Solo Check	01:00 hrs	00:20 hrs
30.04.2022	2nd Solo Check	00:55 hrs	01:00 hrs
09.05.2022	3rd Solo Check	00:45 hrs	00:30 hrs
04.06.2022	4th Solo Check	00:45 hrs	01:15 hrs

Total solo flying hours accumulated prior to accident flight was 03:05 hrs. The last Solo flying exercise was done on 04 June 2022. Performance of the trainee pilot's in previous five periodical assessments including one quarterly was found satisfactory by the assessors.

1.6 Aircraft Information

1.6.1 General Information

Cessna 152 aircraft is an all-metal; high-wing equipped with fixed tricycle landing gear and designed for general aviation utility purposes. Aircraft is powered with one four cylinder Avco Lycoming, O-235-L2C engine with displacement 233.3cu.in. The engine provides rated power of 110 BHP with 2550 RPM engine using 100 LL (low lead) fuel. The aircraft is fitted with fixed pitch Propeller of model No.1A103/TCM6958 with 2 blades.

The aircraft is fitted with Long Range Tanks having a total Fuelling capacity of 39 U. S. Gallon and usable fuel is 37.5 U. S. Gallon. (1 U. S. gallon = 3.78541Liters)

The construction of the fuselage is a conventional formed sheet metal bulkhead, stringer, and skin design referred to as semi monocoque. Major items of structure are the front and rear carry-through spars to which the wings are attached, a bulkhead and forgings for main landing gear attachment at the base of the rear door posts, and a bulkhead with attaching plates at the base of the forward door posts for the lower attachment of the wing struts.

The externally braced wings, containing the fuel tanks, are constructed of a front and rear spar with formed sheet metal ribs, doublers, and stringers. The entire structure is covered with aluminium skin. The front spars are equipped with wing to fuselage and wing-to-strut attach fittings. The aft spars are equipped with wing –to-fuselage attach fitting, and are partial-span spars.

The landing gear is of the tricycle type with a steerable nose wheel and two main wheels. The nose wheel is connected to the engine mount and has an oleo strut to dampen and absorb normal operating loads. The nose wheel is steerable through 8.5° either side of centre. By applying either left or right brake, the degree of turn may be increased up to 30° each side of centre.

The braking system consists of single disc brake assemblies fitted to the main gear and operated by a hydraulic system. Brakes are operated by pushing on the top portion of the rudder pedals. It is possible to use differential braking when taxiing and this allows very tight turns to be made. When the airplane is parked, both main wheel brakes may be set by utilizing the parking brake which is operated by a knob on the lower side of the instrument panel.

General characteristics

- Crew : one pilot
- Capacity : one passenger
- Length : 24 ft 1 in (7.3 m)
- Wingspan : 33 ft 4 in (10.2 m)
- Height : 8 ft 6 in (2.6 m)
- Wing area : 160 ft² (14.9 m²)

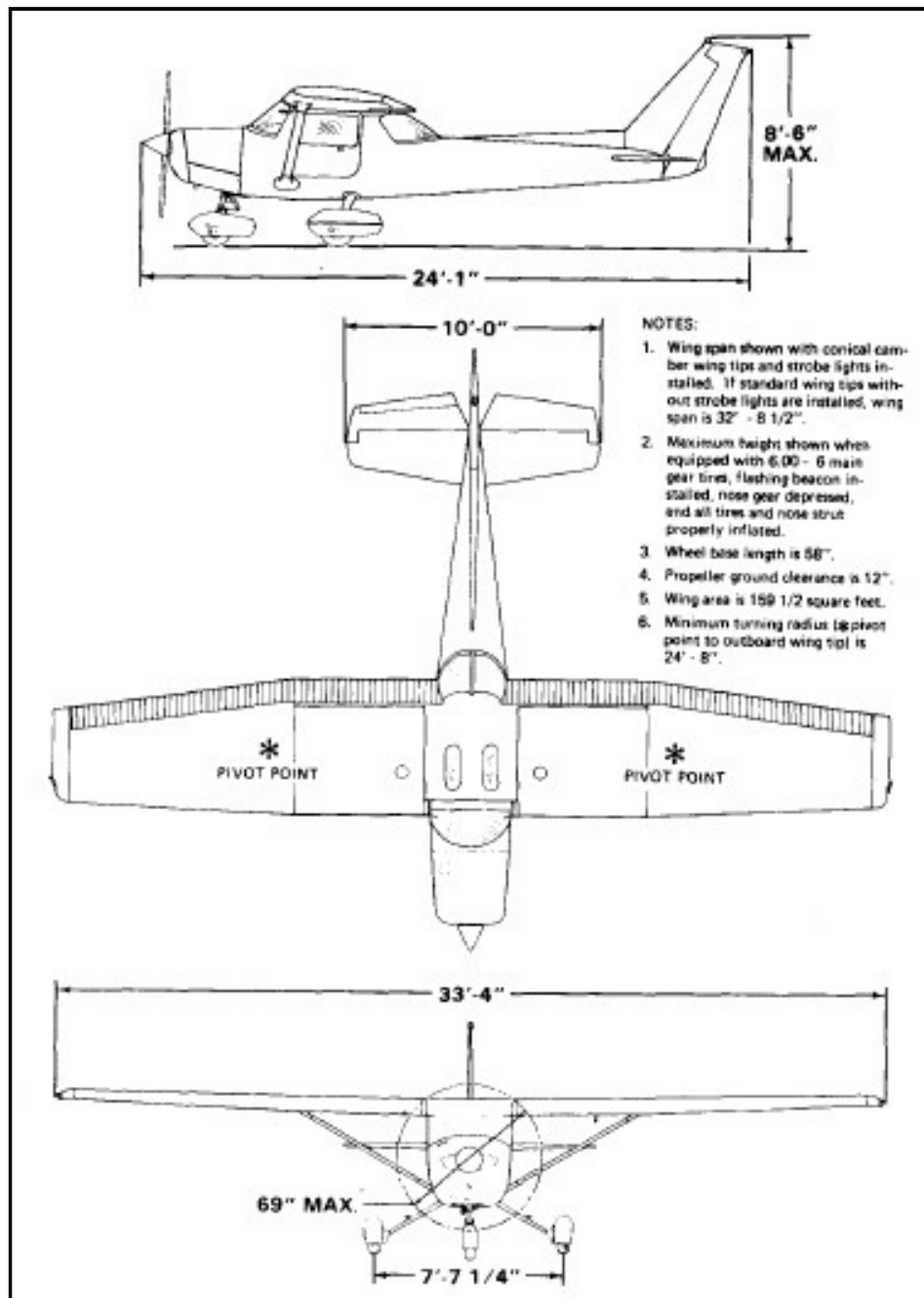


Fig. 1: Three View

Aircraft Performance

- | | |
|--------------------------------------|----------------------------------|
| • Max speed at sea level | : 126 mph (110 knots, 204 km/h) |
| • Cruise speed, 75% power at 8000 Ft | : 123 mph (107 knots, 198 km/h) |
| • Stall speed | : 48 Knots unpowered, flaps down |
| • Take off roll | : 725 ft (221 m) |
| • Extended range 75% at 8000 ft | : 545 Nm with long-range tanks |
| • Endurance 75% at 8000 ft | : 5.2 Hrs. |
| • Service ceiling | : 14,700 ft (4,480 m) |
| • Rate of climb | : 715 ft/min (3.6 m/s) |
| • Max. wing loading | : 10.5 lb/ft ² |
| • Minimum power/mass | : 066 hp/lb (108 W/kg) |

Flight controls

The airplane's flight control system consists of conventional aileron, rudder and elevator control surfaces. They are operated manually through mechanical linkages using a control wheel for the aileron and elevator and the pair of rudder/brake pedals to control the rudder. A manually operated elevator trim tab is provided. Elevator trimming is done using the vertically mounted trim control wheel. Forward rotation of the wheel trims the nose down and vice versa.

Wing Flap system

The wing flaps are of the slotted type with a maximum deflection of 30 degrees. The flaps are electrically operated and controlled by a flap switch lever on the instrument panel. The switch has selections of 10, 20 and 30, with mechanical stops at 10 and 20. A scale and pointer to the left of the switch, indicates the flap position in degrees. Safety is provided by a 15 amp circuit breaker on the right side of the instrument panel.

Ground Control

Effective ground control while taxiing is accomplished through nose wheel steering by using the rudder pedals. Left rudder is used to steer left and right rudder pedal is used to steer right. When a rudder pedal is depressed, a spring loaded bungee which connects the nose wheel to the rudder, will turn the nose wheel approximately 8.5 degrees from centre. By applying either left or right brake, the degree of turn may be increased up to 30 degrees each side of centre.

1.6.2 Left Turning Tendencies of the aircraft

A Cessna 152 aircraft equipped with Lycoming engine, whose propeller rotates in clockwise direction (viewing from inside the cockpit). A single engine, propeller powered aircraft experiences left turning tendencies during take-off due to four different forces acting upon the aircraft. A pilot operating the aircraft should be aware, skilled and alert to handle this aerodynamic phenomenon carefully. Otherwise, with a clockwise rotating propeller the aircraft will veer towards left during the take-off roll.

A left turning tendency occurred due to four distinct forces/effects: Torque, P-factor, spiral slipstream and gyroscopic precession. Torque and spiral slipstream effects are more prominent during take-off roll/high speed taxi.

Torque: As the engine is throttled for takeoff, the right-turning direction of the engine produces a torque in right direction and as per Newton's third law a reaction force acts on the aircraft in left direction. This left direction reaction force tries to move the aircraft towards left.

P-factor: Asymmetric thrust causes the aircraft to turn left.

Spiral slipstream or 'corkscrewing effect': It happens when the propeller is moving fast and the aircraft is moving slowly. During take-off, air accelerated behind the prop (known as the slipstream) follows a corkscrew pattern. As it wraps itself around the fuselage of the aircraft

and it hits the left side of the aircraft's tail, creating a yawing motion, and making the aircraft yaw left. This effect greatly depends on the aircraft design and the flight phase and would be difficult to quantify it.

Gyroscopic precession: During take-off the raising tail creates force on the top of the propeller. Since the propeller is spinning clockwise, that force is felt 90 degrees in the direction of rotation. That forward-moving force, on the right side of the propeller, creates a yawing motion to the left.

The above mentioned forces give a tendency to the aircraft to veer to its left during takeoff. Therefore, right rudder is used to cancel them out and maintain a perfect centerline throughout the takeoff roll.

1.6.3 Aircraft VT-EUW Specific Information

Aircraft Model	CESSNA-152
Aircraft S. No.	15285971
Year of Manufacturer	1985
Name of Owner/ Operator	Government of Odisha/ M/s GATI
C of R	2642/2 (Valid)
C of A(Category / Sub Category)	(Normal/Passenger)
ARC (issue on /valid up)	02.07.2021/02.07.2022
Aircraft Empty Weight	546.408Kgs
Maximum Take-off Weight (MTOW)	758.00 Kgs
Date of Aircraft weighment	17.07.2003 (recalculated)
Max Usable Fuel	93.1 liters
Max Pay load with full fuel	59.56 Kgs
Empty Weight CG	76.134 cm aft of datum.
Next Weighing due	N/A
Total Aircraft Hours	15622:15 Hrs
Last major inspection on the aircraft	50 hrs inspection on 23.05.2022
List of Repairs carried out after last major inspection till accident	NIL
Engine Type	LYCO-O-235 N2C
Date of Manufacture	20.10.2020 (ENGINE O/H DATE)
Engine Sl. No.	RL-12816-15
Last major inspection	50 hrs inspection on 23.05.2022
List of Repairs carried out after last major inspection till date of incidence	Nil
Total Engine Hours	1384:05 Hrs
Propeller (Model /SL.No.)	McCauley 1A103/TCM6958/ LA-034
Total Propellers Hours	456:35 Hrs.
Aeromobile License& Validity	A-0011/01/RLO & 31.12.2022
AD, SB, Modification complied	All applicable complied

The Aircraft is registered in “Normal” category & Sub Division - “Passenger”. The C of A remains valid subject to validity of Airworthiness Review Certificate. The aircraft weight schedule was re-computed on 09 June 2017, which was duly approved by the office of DDG, Kolkata. In accordance with the Civil Aviation Requirement (CAR Section 2, Series ‘X’, Part II,

para4) for re-weighing of the aircraft on periodic basis, re-weighing is not required as per MTOW.

Aircraft had logged 30:10hrs, since the last Scheduled inspection till the time of accident. 50 hrs schedule inspection was the last scheduled inspection that was carried out on the aircraft at 15592:05 airframe hours (TSN) on 23 May 2022. Daily Pre-flight Inspection was carried out by the company authorized Pilot. During the pre-flight inspection no abnormality was observed. The aircraft engine had logged 1384:05hrs (TSO). Last scheduled inspection carried out on the engine was also 50hrs inspection on 23.05.2022.

All concerned Airworthiness Directives, mandatory Service Bulletins, DGCA Mandatory Modifications on this aircraft and its engine have been complied with. As per techlog book no snag was pending for rectification on the date of accident. As per entries made in the Pilot Defect Register, the last snag reported on the aircraft was on 04.05.2022. The entry made in the Pilot defect register as *“While carrying out daily preflight inspection schedule LH & RH tyre found wearing out, to be replaced”*. The snag was rectified on the same day. As per aircraft log book entry, the last DGCA Mandatory Modification (DGCA/CESSNA 152/03 R1) was complied on 08 May 2022.

For the accident flight, load and trim was prepared and center of gravity (CG) was found within limits. After the accident, ELT was found activated and was later switched off by the engineering personnel.

1.6.4 Daily Preflight inspection Schedule

As per Section 3, Page no. 27 of M/s GATI's approved Aircraft Maintenance Program, Issue no. 03, Rev 00 Dated 07.07.2014, Daily Preflight Inspection Schedule is required to be carried out before first flight of the day as per Cessna 152 Service Manual and POH section 4 and Lycoming operator Manual by an appropriate AME/Approved person at main base **Or to be carried out by pilot at out station only. However, during investigation it was found that in Pilots are authorized to carrying out the Daily Preflight Inspection Schedule and no AME was stationed at Birasal Airfield for carrying out the Daily Preflight Inspection.**

1.6.5 Rudder control & Brake system

a) In-Situ Inspection

Post-accident, in order to check and verify the operational condition of the flight controls, operational checks of flight control including Rudder were carried in the presence of investigation team as per applicable maintenance data. Flight control operational was found satisfactory. Rudder movement was also checked for any abnormalities and no abnormality was found. However, rudder operation on both sides was found slightly sluggish due to damages sustained by the nose landing gear attachment. Brake assembly was also inspected as per AMM during the investigation and no abnormalities were found.

b) Maintenance Records

As per maintenance records pertaining to the aircraft VT-EUW, the following salient points were observed:

i) Rudder controls were inspected as per inspection schedule and no abnormalities were observed by the maintenance personnel during last 200 hrs and 100 hrs inspection carried out on 16 Apr 2022 and 08 May 2022 respectively. There is no relevant inspection recommended in 50 hrs inspection schedule.

ii) Wheel and Brakes were inspected as per inspection schedule and no abnormalities were observed by the maintenance personnel during last 200 hrs and 100 hrs inspection carried out on 16 Apr 2022 and 08 May 2022 respectively. There is no relevant inspection recommended in 50 hrs inspection schedule.

iii) Control cables, pulleys and attachment and travel stop were inspected as per inspection schedule and no abnormalities were observed by the maintenance personnel during last 200 hrs inspection carried out on 16 Apr 2022.

All maintenance records were checked and no abnormality was observed.

1.6.6 POH Emergency procedure

As per guidance given in the aircraft's POH section 3 for engine failure during take-off roll. The checklist is required to be followed in the sequence as given below:

1. Throttle – Idle
2. Brakes – Apply
3. Wing flaps – Retract
4. Mixture – Idle Cut/off
5. Ignition Switch – Off
6. Master Switch - Off

Extract from the amplified procedure of POH regarding for engine failure during take-off roll is as appended below:

If an engine failure occurs during the take-off run, the most important thing to do is stop the airplane on the remaining runway. Those extra items on the checklist will provide added safety after a failure of this type.

1.7 Meteorological Information

M/s GATI, present ATC cabin is equipped with weather equipment and utilizes the same to obtain Wind data, temp, dew point and QNH. The cloud data is based on the Bhubaneswar METAR and the input given by the pilot flying in the LFA of Birasal.



Fig.2: Wind equipment



Fig.3: Display Unit

The METAR recorded in the MET register maintained by M/s GATI, in the ATC tower are tabulated below:

Time (UTC)	Visibility (m)	Wind	Cloud	Temp	Dew Point	QNH	Trend
0630	5000	200° 05KT	SCT030	34° C	26°	1002	No Sig
0730	5000	190° 05KT	SCT030	35° C	26°	1003	No Sig
0900	5000	220° 03KT	SCT030	36° C	26°	1000	No Sig

As per SOP for flying at Birasal Aerodrome, M/s GATI is permitted to operate VFR flying only. Para 9.5 of M/s GATI TPM, trainees are required to fly solo under Visual Meteorological Condition (VMC). Where VMC is defined as “*Meteorological conditions expressed in terms of visibility distance from cloud, and ceiling, equal to or better than specified minima*”.

1.8 Aids to Navigation

There is no radio navigation aids available at Birasal Aerodrome. The Birasal Aerodrome has got only one runway and is a “Visual Approach Runway” which is equipped with two ‘Wind Sock’ installed on both ends.

1.9 Communications

Birasal Airfield is an “Uncontrolled Airfield”. However, the M/s GATI has set up its own temporary ATC cabin for maintaining flight coordination in air. M/s GATI, Birasal utilizes 122.325 MHz frequency for VHF communication between ATC (Birasal) and flying aircraft in Local Flying Area (LFA). The communication system of the aircraft was serviceable and the aircraft was in contact with the ATC prior to the accident.

1.10 Aerodrome Information

The Birasal Aerodrome is an “Uncontrolled aerodrome, located at Birasal, in Dhenkanal district Odisha, India. It is managed by Birasal Aerodrome Limited (BAL). The orientation of the runway is 09/27. The runway dimension is 4000 *80ft. Fire Tender services are being provided by the Govt. of Odisha.

Airfield Co-ordinates: Lat: 20°59’0.65” N, Long: 85°40’44.48” E

Elevation: 262 AMSL feet

M/s GATI is utilizing the aerodrome facility for flying training purpose. The Air Traffic Control (ATC) was manned by full time/dedicated ATC personnel during normal flying hours. Frequency used for VHF communication is 122.325 MHz.

1.11 Flight Recorders

VT-EUW was not required to be fitted with Cockpit Voice Recorder (CVR) or Digital Flight Data Recorder (DFDR) as per the prevailing DGCA, Civil Aviation Requirement. No Cockpit Voice Recorder (CVR) or Digital Flight Data Recorder (DFDR) was found installed on the aircraft.

1.12 Wreckage and Impact Information

a) Immediately, after the trainee pilot opened the full engine power, aircraft started deflecting towards left and right. Trainee pilot was not able to maintain the aircraft on centerline. Thereafter, aircraft veered towards left, trainee pilot applied brakes and move the throttle to IDLE. Subsequently, aircraft exited the runway and kept on rolling under momentum. Aircraft's nose section hit a concrete drain cover of water drainage line running parallel to the runway. Subsequently, both landing gears hit the other concrete covers of water drainage line one by one. Due to sudden impact aircraft jumped and crossed the concrete cover of water drainage line. Due to the impact with the concrete drain cover of water drainage line, NLG assembly, propeller got detached from its base, RH MLG wheel assembly got damaged and tyre also got deflated. However, no major damage occurred to LH MLG wheel assembly. After jumping over the water drainage line aircraft momentum decreases and finally aircraft came to rest. The final track of the aircraft is depicted below:



Fig. 4: Final Track

b) Most of the wreckage was confined to one place except few aircraft parts, which sheared off due to impact and scattered, for example as NLG was found at 19 ft, shimmy dampener was found at 63.5ft, steering rod was found at 28.7ft, propeller was found at 17 ft, propeller mounting bulkhead was



Fig. 5: Aircraft Final Rest Position

found at 12 ft, part of RH MLG wheel hub was found at 100.7ft, and a small part of RH MLG wheel brake was found of at 61.6ft from the main wreckage.

During the wreckage examination, the following was observed about the cockpit:

- Flap lever was found at 10° position. Whereas, Flaps on the aircraft were found at 30°. The reason for the variation could not be established.
- Throttle control knob was found in idle position.
- Master and Ignition were found in off position.
- The mixture knob was found in cut off position.
- Fuel Shutoff valve knob was found in closed position.

The trainee pilot put the throttle to idle position. Dy. CFI turned off the Master and ignition post-accident. One of the flying instructors turned off the fuel shut off vale.

c) During the accident, the aircraft sustained substantial damages. Following are some major damages sustained by the aircraft.

1. Nose Landing gear was found detached from the engine mount (Refer **Figure 6**). Shimmy dampener and Nose wheel steering rod were also found detached from landing gear assembly.



Fig. 6: Nose Landing Gear



Fig. 7: Shimmy Dampener

2. The RH landing gear strut was found bent and was also found loose (Refer fig.8). Skin near wing attachment was found sheared off from rivet joint. Tyre was found deflated and lower portion of wheel hub was found broken. Brake assembly was also found damaged.



Fig. 8: Damaged RH MLG



Fig. 9: Broken wheel hub RH MLG

3. The LH wing was found damaged near tip (Refer fig. 10). Wind shield was also found cracked vertically on LH side at one place (Refer fig. 12). Nose lower engine cowling was found completely damaged.



Fig. 10: Damaged LH wing



Fig. 11: Damaged RH FWD section



Fig. 12: Cracked wind shield



Fig. 13: Damaged Nose Section

5. Propeller was found sheared off from the propeller mounting bulkhead (Refer Figure 14). Propeller spinner and bulkhead was also found completely damaged.



Fig. 14: Damaged Propeller



Fig. 15: Damaged spinner

1.13 Medical and Pathological Information

The trainee pilot had undergone the Breath Analyzer (BA) test before the training sortie at Birasal Aerodrome as per prevailing DGCA regulations and the test result was satisfactory. Post-accident, the trainee pilot's medical examination was conducted and the result was also satisfactory.

1.14 Fire

There was no fire pre or post-accident.

1.15 Survival Aspects

The accident was survivable.

1.16 Tests and Research

1.16.1 Fuel, Engine Oil & Transmission Sample Report

Fuel sample collected from the aircraft VT-EUW was subjected to fuel specification test at DGCA Fuel & Oil laboratory. As per the laboratory test report received, there was no abnormality in the sample and it passed the specification test.

Engine Oil sample collected from the aircraft VT-EUW was subjected to specification test at DGCA Fuel & Oil laboratory. As per the laboratory test report received, there was no abnormality in the sample and it passed the specification test.

1.17 Organizational and Management Information

1.17.1 GATI General

M/s GATI is a DGCA approved Flying Training Organization (FTO) situated at Birasal, Dhenkanal, Odisha. M/s GATI is also approved to operate from Biju Pattanaik Airport, Bhubaneswar, Odisha, as other base. DGCA FTO approval No. is 10/2016, and approval was valid up to 27.12.2022. Approval validity was further extended by the DGCA till 27.12.2027. Scope of approval is Aeroplanes up to-PPL, CPL, IR, AFIR, FIR and extension of aircraft ratings single engine / multi engine. As on date of accident the organization was having three types of single engine aircraft and one multi engine aircraft in its fleet. Aircraft fleet consists of 01 Cessna 152, 01 Cessna 172R, 01 Cessna 172S and 01 multi-engine PA34 aircraft.

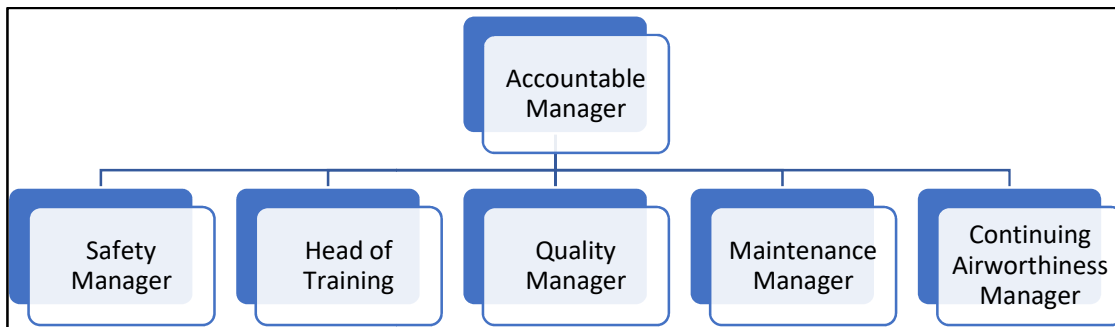


Fig. 13: Organization Chart

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

1.17.2 Flight Radio Telephone Operator's License (Restricted)

(a) As per Privileges given in Para 4, Section Z, Schedule II of the Aircraft Rules, 1937, only a holder of FRTOL(R) shall be to operate radio telephone apparatus on board aircraft for two-way communication on VHF. Same is as quoted below:

4. Privileges – Subject to the endorsement in the license, the privileges of a holder of a Flight Radio Telephone Operator's (Restricted) License shall be to operate radio telephone apparatus on board as aircraft for two-way communications on VHF.

However, as per the flying training records, trainee pilots were allowed to do RT call on board an aircraft without acquiring FRTOL(R).

(b) As per Para 4.4 & 5.4 of M/s GATI approved TPM, prior to commencement of flying training a student should have FRTOL(R). Relevant extract from TPM is appended below:

On successful completion of ground training for SPL, FRTOL (R), and obtaining minimum medical Clearance (minimum class II) students shall report to FOD for commencement of Flying Training.

However, as per trainee pilot FTPR, Flying training exercise was started on 10 Dec 2021, whereas, FRTOL (R) was issued on 31 Jan 2022, after completing 06:55 hrs of flying.

(c) As per syllabus given for CPL flying training in M/s GATI's TPM, trainee pilots are required to exercise RT call from second sortie onwards. After completing RT call (assisted) practice in two sorties, trainee pilots are required to perform unassisted all RT call (start up till shutdown) from forth sortie onward. Extract from TPM is appended below:

Cessna 152/172									
Dual	Solo	Exercise	Total Dual	Total Solo	If	Prog IF	DXC	SXC	Prog Total
0:45		Air Fam.	0:45	0:00	0:00	0:00	0:00	0:00	0:45
		EXERCISE: Introduction of student to the physical sensations of flight & the flying environment. Student will be shown easily identifiable local landmarks, general airfield layout and instrument indications. DEMO: Checks, Taxi, Line Up, Take Off.							
1:00		GF	1:45	0:00		0:00			1:45
		ESSENTIAL KNOWLEDGE: Student to know- Pertinent documentation before & after flight. How to determine if aircraft is serviceable for flight? External & internal checklist thoroughly practiced. EXERCISE ASSISTED: Checks, Start- up, Taxi, Line-Up, Take-off, and Sector Establishment. DEMO: Control operation and response, Ancillary control operation, Aircraft instruments, Effect of Flaps, Effect of Power, Effect of slipstream & airstream. ASSISTED: Rejoin, RT, Circuit & landing, Shutdown.							
1:00		GF	2:45	0:00		0:00			2:45
		ESSENTIAL KNOWLEDGE: Student to know – Startup, Taxi, Run-up Procedure & Precautions POH : Aircraft Limitations, All speeds Procedure - Sectors, Climb, Descend, Straight & Level Interpretation & working of all cockpit instruments Emergency- Engine fire during Start – Actions EX:UN ASSISTED: Checks, Start- up, Taxi, Line-Up, Take-off, Sector Establishment, , Shutdown. DEMO & PRACTISE : Climb, Descend, Straight & Level, Level Medium Turns, Climbing & Descending Turns ASSISTED: Rejoin, RT, Circuit & landing.							
1:00		GF	3:45	0:00		0:00			3:45
		ESSENTIAL KNOWLEDGE: Student to know – Important Landmarks each sector & around airfield. Procedure – Steep Turns, Stalls in cruise and landing configurations Emergency- Engine failure during take-off, after take-off. ASI not registering during Take-off All RT Calls from Startup to Shutdown EX:UN ASSISTED : Checks, Start- up, Taxi, Line-Up, Take-off, Sector Establishment, Climb, Descend, Straight & Level, Level Medium Turns, Rejoin, RT, Shutdown DEMO & PRACTISE: Steep Turns, Stalls ASSISTED: 1 Circuit & landing.							

(d) During the investigation, records of other student pilot were also check to understand the prevailing organizational practices. It was observed from the other student's records that their flying training exercise was started long before getting FRTOL (R).

(e) During the investigation, other FTO status was also verified by the investigation team. Flying training practices were found same i.e., trainee pilot were found using privileges without acquiring FRTOL(R).

1.17.3 Engine failure during take-off

As per syllabus given for CPL flying training during General Flying sortie in M/s GATI's TPM, trainee pilots are required to practice, handling of few emergency situations such as Engine fire during start, Engine failure during take-off and Engine failure after take-off etc. Relevant extract from TPM is appended below:

1:00		GF	2:45	0:00		0:00			2:45
		ESSENTIAL KNOWLEDGE: Student to know – Startup, Taxi, Run-up Procedure& Precautions POH : Aircraft Limitations, All speeds Procedure - Sectors, Climb, Descend, Straight & Level Interpretation & working of all cockpit instruments Emergency- Engine fire during Start – Actions EX:UN ASSISSTED: Checks, Start- up, Taxi, Line-Up, Take-off, Sector Establishment, , Shutdown. DEMO & PRACTISE : Climb, Descend, Straight & Level, Level Medium Turns, Climbing & Descending Turns ASSISSTED: Rejoin, RT, Circuit & landing.							
1:00		GF	3:45	0:00		0:00			3:45
		ESSENTIAL KNOWLEDGE: Student to know – Important Landmarks each sector & around airfield. Procedure – Steep Turns, Stalls in cruise and landing configurations Emergency- Engine failure during take-off, after take-off. ASI not registering during Take-off All RT Calls from Startup to Shutdown EX:UN ASSISSTED : Checks, Start- up, Taxi, Line-Up, Take-off, Sector Establishment, Climb, Descend, Straight & Level, Level Medium Turns, Rejoin, RT, Shutdown DEMO & PRACTISE: Steep Turns, Stalls ASSISSTED: 1 Circuit & landing.							

However, as per trainee pilot records, trainee pilot had received only demonstration and not practiced the engine failure during take-off.

1.17.3 Maintenance Base

M/s GATI is approved to carry out maintenance at Biju Pattanaik Airport, Bhubaneswar. **Birasal aerodrome is not an approved maintenance location for carrying out maintenance work.** M/s GATI is authorized to carry out only pre-flight inspection at Birasal Aerodrome/ **However, Birasal aerodrome is approved as a main base for flying training activities** and Bhubaneswar airport is as an approved other operation base. No AME is stationed at Birasal aerodrome, to perform the daily pre flight inspection as required for flying activities. Further

M/s GATI has authorized its Flying instructor to carry out Daily Pre-Flight Inspection (A pre-flight inspection required to be carried out daily prior to first flight of the day) in accordance with procedure given Para 1.11 of its CAME. During investigation, it was observed that the daily pre-flight inspection of accident flight was carried out by a Flying Instructor, whose authorization was issued by the Aircraft Maintenance Manager instead of Quality Manager as per officiating arrangement given in the Part 2 of Maintenance Organization Manual (MOM), issue 02, dated 04.05.2017. As per MOM's procedure, DGCA is required to be intimated regarding the officiating arrangement exercised by the organization. However, no such intimation was communicated to DGCA.

1.18 Additional Information

1.18.1 FTPR

As per Para 15.3 DGCA CAR Section 7 Series D Part I, every FTO has to maintain flying training progress report for each student. Relevant Para from DGCA CAR Section 7 Series D Part I, is quoted below:

15.3 Flying Training Progress Report(FTPR)

15.3.1 A Flying training progress report is a confidential document and must be maintained for each student. Each flight shall reflect the progress of the flying training. FTPR shall include information such as Name and address of the trainee; Educational Qualification; police verification information; license details e.g. SPL, FRTOL(R) details etc.; flying training details dual, solo, day, night, exercises & progress; accident-incident details; Examination details; Record of periodic check by CI/CFI/Dy.CFI.

15.3.2 Each entry shall be signed by Instructor. At the end of the course the FTPR shall be countersigned by CI or CFI/Dy. CFI.

However, during scrutiny of FTPR of the involved trainee pilot, the following was observed:

- a) Exercises listed in the Flying Training Exercise on page 9 of FTPR includes some exercise which are not exercised nowadays as these exercises are prohibited under Aircraft Rules 1937 such as spiral, intentional spin and aerobatics etc.
- b) As per instructions given in the page no. 91 of FTPR, Instructor's Periodical Assessment section is required to be completed by the CFI of the School. However, in practice, it was found filed and signed by other flying instructors.

1.18.2 Aborted Take-off /Rejected Take-Off

A rejected take-off (RTO) or aborted take-off is a critical situation, which requires discontinuing of the intended take-off, due to unavoidable reason/circumstances. A rejected take-off (RTO) or aborted take-off is desirable in many circumstances for safety reasons.

M/s GATI's DGCA approved TPM does not have any mention in their training syllabus on imparting training on rejected take-off /aborted take-off. Although, while imparting training for emergency in circuit & landing exercise, flying instructor demonstrates the engine failure during take-off as per POH, which is one of the example of rejected take-off /aborted take-off.

Further, as per M/s GATI's DGCA approved TPM (Revision 8) Appendix VI, rejected take-off is included as one of the departure check in Pilot's Proficiency/ IR check. Relevant extract is appended below:

Appendix VI					
PILOT'S PROFICIENCY / IR CHECK					
INSTRUMENT RATING		INITIAL RENEWAL			
PPC		CREW STATUS		P1 P2	
PILOT CHECK REPORT					
Place of Test VOMY					
GOVT. AVIATION TRAINING INSTITUTE, BHUBANESWAR			DURATION: 01:20 Hrs		
PILOT UNDER CHECK:		LICENCE NUMBER:		TEST DATE	
				Day Month Year	
EXAMINER/INSTRUCTOR:		LICENCE NUMBER:		FLIGHT TEST TIME	
				On Off	
AIRPLANE/SIMULATOR		AIRCRAFT/SIMULATOR TYPE:		REGISTRATION/LOCATION:	
In items 1 to 9 enter "s" (Satisfactory) or "U" (Unsatisfactory). Note: Items marked "#" to be completed only on Simulator. Item 2B and 2C are mandatory. Any Engine- Out exercises conducted on airplane are to be simulated only.				INSTRUMENT RATING	
				PILOT PROFICIENCY	
1 PRE-FLIGHT		A Flight Deck Preparation			
		B Checklist & Procedures			
		C Navigation And Communication Settings			
		D Engine Starts (Including Non-Normals)			
2 DEPARTURE		A Taxi (LVO)			
		B # Rejected Take-Off Including LVO If Applicable			
		C # Engine Failure At Or After V1			
		D Departure Procedures (# Instrument Malfunctions)			
3		A Weather Avoidance			

Inclusion of rejected take-off in proficiency / IR check during pilot check report highlights the importance of rejected take-off/ aborted take-off. Further it one of the most important desired skill for the safety of its occupants.

1.19 Useful or effective investigation techniques

Nil

2. ANALYSIS

2.1 Serviceability of the Aircraft

At the time of the accident, aircraft's C of R, C of A, ARC and Aero Mobile License were valid and current as per applicable DGCA CAR. Aircraft weight schedule was also valid at the time of accident. Load and trim sheet was prepared and C.G of the aircraft was within the OEM's prescribed limits. All concerned AD, SB, mandatory SB, and DGCA Mandatory Modifications on this aircraft and its engines were complied with as on date of event. The last C.R.S. was issued at 15592:05 hrs (TSN) on 23.05.2022 after completion of the 50hrs schedule inspection. Aircraft had flown 30:10hrs prior to accident flight and no snag was pending for rectification. Therefore, as per aircraft records the aircraft was airworthy.

Before entering the assigned runway, flight controls and instruments were checked. During flight control check, no abnormality was observed by the trainee pilot except Rudder pedals

movement. However, trainee pilot was not sure about the same and as there was no snag reported in the previous sortie, so, the trainee pilot negated the observation on the rudder pedal and continued the sortie. Further during investigation Rudder controls system (cables and travel limits as per AMM) were examined and no abnormality was found. Therefore, the un-serviceability of the Rudder control has been eliminated. Similarly, brake assembly was also examined by the AME and no abnormality was found. **In view of above, it is concluded that the serviceability of the aircraft was not a contributory factor to this accident.**

2.2 Weather

As per METAR registered by the ATC personnel at 0730 UTC, at the time of accident, visibility was 5km and wind was 05kt & 190°. Therefore, it is concluded that the weather was as per VFR condition and **weather was not a contributory factor to this accident.**

2.3 Crew qualification and handling of the aircraft

2.3.1 Crew qualification

The trainee pilot was holding a valid Student pilot license as per DGCA prevailing regulation and was appropriately authorized to undertake the training flight. Therefore, it is concluded that the crew qualification was not a contributory factor to this accident.

2.3.2 Crew handling

Before entering the assigned runway, flight controls and instruments were checked by the trainee pilot. During flight control check, no abnormality was observed except Rudder control. However, trainee pilot was not sure about the same and as there was no snag reported in the previous sortie, the trainee pilot ignored the observation on the rudder control. As per standard practices, in case of any doubt regarding redder pedals movement, the sortie should have been discontinued or the instructor informed. However, **the trainee pilot did not exercise the above options and opted to continue the sortie.**

After aircraft lined up on the runway 27, trainee pilot carried out the before take-off vital checks. After completion of checks, the trainee pilot opened the engine power gradually with a small right rudder input. The trainee pilot had already received one demonstration on slipstream during general flying on 11.12.2023 and was aware of the fact that a single engine propeller aircraft have a left turning tendency during take-off due to aerodynamics forces. As per trainee pilot's training records, left alignment was one of the major issues. Further, **trainee pilot was not sure about the amount of rudder input applied.**

When the aircraft speed approached 50KT, aircraft started moving towards left and right due to left turning tendency effect and rudder inputs given by the trainee pilot to correct the same. As the Left turning tendency effect becomes more prominent with increase in speed, so the aircraft started veering toward left. At 55KT the trainee pilot took the decision to abort/reject the take-off and applied the brake to slow down the aircraft. When the aircraft did not stop on the runway, trainee pilot put the throttle to IDLE. As the trainee pilot had never practiced, aborted take-off, and was under panic condition, the sequence of application of brake and moving the throttle to IDLE is just the opposite of the sequence

recommended in the POH emergency procedure checklist (refer above Para 1.6.5). Therefore, the aircraft did not respond exactly as required in this situation and did not stop. **This indicates lack of skill due to lack of practice for aborted/rejected take-off. This also indicates that the trainee pilot was under the panic condition.** Thereafter, trainee pilot lost the control over the aircraft completely. Due to panic trainee pilot went blank and no further input was given to the aircraft. Aircraft exit the runway and headed towards the water drainage line. Aircraft decelerated and stopped after the impact with the concrete drain cover of water drainage line. Trainee pilot opened the door and came out of the aircraft.

Based on above discussion and considering experience of the trainee pilot, **it is concluded that crew handling was one of the major contributory factor to this accident.**

2.4 Organizational Practices

1) Daily Pre-Flight Inspection

a) In M/s GATI's approved MOM, flying instructors are authorized to carryout Daily pre-flight inspection. However, as per Section 3, Page no. 27 of M/s GATI's approved Aircraft Maintenance Program (AMP), Daily Preflight Inspection Schedule is required to be carried out before first flight of the day as per Cessna 152 Service Manual and POH section 4 and Lycoming operator Manual by an appropriate AME /Approved person at main base or **to be carried out by pilot at out station only. This is a non-adherence to the DGCA approved AMP procedure.**

b) Daily pre-flight inspection authorization was issued by the Aircraft Maintenance Manager instead of Quality Manager as per officiating procedure. However, no intimation was given to DGCA as required in the approved CAME and MOM procedure. **This is also a non-adherence to the DGCA approved CAME and MOM procedure.**

2) FRTOL (R)

a) As per Privileges given in Para 4, Section Z, Schedule II of the Aircraft Rules, 1937, a holder of FRTOL shall be to operate radio telephone apparatus on board aircraft for two-way communication on VHF. However, as per prevailing organization practice trainee pilots are carrying out RT exercise without FRTOL(R) i.e., exercises the privilege without getting license. **This is a non-adherence to the Para 4, Section Z, Schedule II of the Aircraft Rules, 1937.**

b) As per M/s GATI's approved TPM, prior to commencement of flying training a student should have FRTOL(R). However, during investigation it was observed that the organization is imparting flying training to trainee pilot prior to obtaining FRTOL(R). Further, as per DGCA approved training syllabus trainee pilots are doing RT (unassisted) during training sortie without obtaining FRTOL(R). **This is also a non-adherence to the approved TPM procedure.**

c) During the investigation, records of other student pilot were also examined to understand the prevailing Organizational/industry practices. As per other student's record

the flying training exercise was started long before getting FRTOL (R).The same practice has been observed by the investigation team in various FTOs.

3) FTPR

As per Para 15.3 DGCA CAR Section 7 Series D Part I, every FTO has to maintain flying training progress report for each student. **However, scrutiny of FTPR of the involved trainee pilot reveals that the FTPR format needs amendment in line with current regulations.**

4) Rejected Take-Off /Aborted Take-Off

(a) M/s GATI's DGCA approved TPM does not have any mention in their training syllabus on imparting rejected take-off /aborted take-off. Although, while imparting training for emergency in circuit& landing exercise, flying instructor demonstrate engine failure during take-off as per POH, which requires rejected take-off /aborted take-off. **However, the trainee pilots were not made to practice the same.**

(b) Further, as per M/s GATI's DGCA approved TPM (Revision 8) Appendix VI, rejected take-off is included as one of the departure check in Pilot's Proficiency/ IR check. **This highlights the importance of rejected take-off/ aborted take-off in flying training.**

2.5 Circumstances leading to the Accident

Following are the circumstances which led to this accident.

- a. After the aircraft lineup on the assigned runway, the trainee pilot had applied power and with small right rudder input. As the aircraft speed approached 50 KT, trainee pilot experienced aircraft directional control issue due to two unbalanced forces. In other words, first force was "Left Turning Tendency" (refer Para 1.6.2), which was trying to veer the aircraft towards left and the second force was right rudder input applied by the trainee pilot to compensate the first. Due to unequal inputs/forces the aircraft went into lateral movement i.e., left-right. Although, the trainee pilot had received slipstream demonstration during one G/F training sortie and had completed four solo C/L. But the remarks made in the FTPR regarding left alignment during take-off roll highlights the trainee pilot's left inclining tendencies. Therefore, the trainee pilot was more conscious about aircraft alignment during take-off roll and gave improper rudder input, which led to directional control issue.
- b. Engine failure during take-off roll is of one of the emergency exercises akin to aborted/rejected take-off. Organization normally considered this exercise as a substitute to aborted/rejected take-off practice. As per trainee pilot's FTPR, during C/L emergency sortie, instructor had demonstrated this exercise to the trainee pilot. However, the same was neither performed by the trainee pilot. In addition, the trainee pilot had never practice aborted /rejected take-off and was not acquainted with the rejected take-off procedure. Therefore, to abort the take-off at 55K, trainee pilot applied the brake first and then put the throttle to IDLE (just reverse sequence as per checklist given in the POH Section 3, Engine failure during take-off roll). Consequently, the aircraft did not respond

exactly as required in this situation and did not stop. Subsequently, under panic situation the trainee pilot did not apply further input. Aircraft went into unpaved surface and hit the drain cover of water drainage line. Due to collision aircraft lost its momentum, decelerated and finally came to rest. **Had the trainee pilot been trained for handling aborted/rejected take-off, the accident could have been averted.**

3. CONCLUSION

3.1 Findings

1. Aircraft's C of R, C of A, ARC and Aero Mobile License were valid and current.
2. Aircraft weight schedule was valid and Load and Trim sheet was prepared for the accident flight and C.G was within limits.
3. No snag was pending on the aircraft and its engine for rectification.
4. Involved aircraft rudder control and brake were examined by a DGCA license holder AME and no abnormality was observed.
5. Trainee pilot was appropriately licensed, qualified and authorized as per prevailing DGCA civil Aviation Requirement (CAR) to undertake the flight.
6. Trainees are being imparted RT related training without acquiring FRTOL(R) license against the approved TPM procedures.
7. Trainee pilot had received one demonstration on slipstream during general flying sortie.
8. Trainee pilot had received one demonstration on aborted/rejected take-off, during C/L exercise, engine failure during take-off. However, trainee pilot had never practiced the same.
9. Trainee pilot had a history of left alignment issue.
10. FTPR format used by the approve FTOs needs immediate amendments.
11. Flying instructors are authorized to carryout daily pre-flight inspection and no maintenance personnel are stationed at Birasal aerodrome, though it is the main flying training base.
12. In issuance of daily pre-flight inspection authorization by the Aircraft Maintenance Manager, DGCA approved CAME and MOM procedure was not followed properly.
13. Flying Training Organizations are allowing the trainee pilots to do RT (unassisted) onboard prior to acquiring FRTOL(R).

3.2 Probable cause of the Accident

The probable cause of this accident is attributed to the inappropriate handling of the aircraft by the trainee pilot.

One of the contributory factors to this accident is lack of training experience on rejected take-off /aborted take-off.

4. SAFETY RECOMMENDATIONS


It is recommended that

4.1 DGCA may carry out a onetime assessment of all the FTOs and review the practice of imparting RT related training without acquiring FRTOL(R) license to the trainees. DGCA may also assess whether there is any misuse of privileges given in Para 4, Section Z, Schedule II of the Aircraft Rules, 1937. Based on the outcome of the assessment DGCA may take further corrective action as per DGCA's CAR.

4.2 DGCA may amend the format of FTPR to meet the requirements laid down in the current regulations.

4.3 DGCA may issue directions to all FTOs to include rejected take-off/ aborted take-off in their TPM, so that the training on rejected take-off/aborted take-off is imparted mandatorily by them and records of the same will be maintained.

4.4 The Organization should impart corrective training to the trainee pilot by giving more stress on basic flying skill or airmanship such as rejected take-off/ aborted take-off and slipstream.



Amit Kumar

Investigator In Charge

Date: 18 April 2023

Place: New Delhi