



**Final Investigation Report**  
**on**  
**Accident to M/S Jharkhand Flying Institute,**  
**Sinus 912 Motor Glider aircraft, VT-GDI at Dhanbad airport on 23 March 2023**

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

## **FOREWORD**

*In accordance with Annex 13 to the Convention on International Civil Aviation Organization (ICAO) and Rule 3 of Aircraft (Investigation of Accidents and Incidents), Rules 2017, the sole objective of the investigation of an Accident/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 OF ABBREVIATIONS USED IN THIS REPORT

AAIB	Aircraft Accident Investigation Bureau
AD	Airworthiness Directives
AME	Aircraft Maintenance Engineer
AMM	Aircraft Maintenance Manual
AMP	Aircraft Maintenance Program
AMSL	Above Mean Sea Level
ARC	Airworthiness Review Certificate
ATC	Air Traffic Control
BA	Breath Analyzer
BHP	Brake Horse Power
CAD	Civil Aviation Department
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
CAMO	Continuing Airworthiness Management Organization
CAR	Civil Aviation Requirements
CFI	Chief Flight Instructor
CG	Centre of Gravity
CPL	Commercial Pilot Licence
CVR	Cockpit Voice Recorder
DDG	Deputy Director General
DFDR	Digital Flight Data Recorder
DGCA	Directorate General of Civil Aviation
ELT	Emergency Locator Transmitters
FRTOL (R)	Flight Radio Telephone Operator License (Restricted)
FT/ft	Feet
FTO	Flying Training Organizations
FTPR	Flight Training Progress Report
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
M	Meter
MET	Meteorological Service
METAR	Meteorological Aerodrome Report
MLG	Main Landing Gear
MHz	Mega Hertz
MTOW	Maximum Take-off Weight
N/A	Not Available

NLG	Nose Landing Gear
NM	Nautical Miles
O/H	Overhaul
PL(G)	Pilot's License (Glider)
POH	Pilot's Operating Handbook
RH	Right Hand
RPM	Revolutions Per Minute
RT	Radio Telephony
SB	Service Bulletin
SOP	Standard Operating Procedure
TPM	Training Procedure Manual
TSN	Time Since New
TSO	Time Since Overhaul
UTC	Coordinated Universal Time
VFR	Visual Flight Rules
VHF	Very High Frequency
VMC	Visual Metrological Conditions

## SUMMARY

Accident details of Sinus 912 Motor Glider aircraft VT-GDI at Dhanbad airport on 23 March 2023			
1	Aircraft	Type	Sinus 912 Moto Glider
		Nationality	Indian
		Registration	VT – GDI
2	Owner		M/s Aero Club of India
3	Operator		Director Jharkhand Flying Institute
4	Pilot – in –Command		PL(G) holder
	Extent of Injuries		Minor Injuries
6	Passengers on Board		01
	Extent of Injuries		Serious Injuries
7	Place of Accident		Dhanbad Airport
8	Date & Time of Accident		23 March 2023 & 1720 IST
9	Last point of Departure		Dhanbad Airport
10	Point of intended landing		Dhanbad Airport
11	Latitude/Longitude of accident site		Lat: 23°83'94'' N
			Long: 86°.41'63'' E
12	Type of Operation		Joy Ride
13	Phase of Operation		Initial Climb
14	Type of Accident		Fuel Starvation

(All the timings in this report are in Indian Standard Time (IST) unless otherwise specified)

## **SYNOPSIS**

On March 23, 2023, Jharkhand Flying Institute's Sinus 912 motor glider aircraft, registration VT-GDI, while operating a joy ride sortie, crash-landed in a residential area 1 km southwest of Dhanbad airport.

On that day, prior to the accident, the pilot had flown three dual training sorties on the same aircraft, VT-GDI. The pilot held a valid DGCA Glider Pilot license. The three training sorties were uneventful, and no snags were reported. Subsequently, the fourth sortie for the joy ride was conducted with one passenger onboard. During the fourth sortie, the pilot switched on the engine and quickly initiated the take-off roll on runway 25. Consequently, the aircraft took off within a few seconds of engine start. As soon as the aircraft became airborne, a "Low Fuel Pressure Alarm" popped up on the cockpit display unit. After a few seconds, the aircraft's engine stopped mid-air. The pilot attempted to restart the engine by cranking it once, but the engine did not start. Thereafter, the aircraft began losing altitude.

Within one and a half minutes of becoming airborne, the aircraft crashed in a residential area 1 km southwest of Dhanbad airport. Both the pilot and the passenger suffered injuries, and the aircraft sustained substantial damage.

Director General, Aircraft Accident Investigation Bureau issued order no. INV.11011/04/2023-AAIB dated 10th April 2023 to investigate and determine the probable cause(s) and contributory factor(s) leading to the accident.

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 March 23, 2023, M/s Jharkhand Flying Institute's Sinus 912 motor glider aircraft, registration VT-GDI, was scheduled to operate training sorties at its Dhanbad airport base. In the morning, before the first sortie of the day, a preflight inspection was carried out by a DGCA-licensed AME. During the inspection, the AME added 50 ml of oil to the aircraft's engine to maintain the oil level within the normal operating range.

According to the AME's statement, the fuel available onboard was 27 Liters, which was sufficient for the local training sortie, so no additional fuel was added. No discrepancies were observed during the preflight inspection. After the satisfactory completion of the inspection, the AME made an entry in the aircraft's technical logbook at 09:00 hours IST.

On that day, the pilot reported for duty at 09:40 hours IST at Dhanbad airport. As per the organization's prevailing practice, the pilot did not undergo the mandatory preflight Breath Analyser Test (B.A. test) and only signed the B.A. register maintained by M/s JFI at Dhanbad airport. At 10:00 hours IST, the pilot accepted the aircraft VT-GDI and signed the acceptance section in the aircraft's technical logbook.

Two dual training sorties of 20-minute duration each were carried out between 10:00 and 10:45 hours IST, with only a 5-minute interval between the two sorties. After the completion of the second sortie, at 11:00 hours IST on pilot's request, 10 Liters of fuel was uplifted to the aircraft by the AME, bringing the total fuel onboard to 35 Liters. Flying was then stopped for the forenoon session, and the pilot went home for lunch.

Post lunch, the pilot's family also arrived at the hangar along with the pilot. Following the break, the flying session resumed, and one dual training sortie of 20-minute duration was carried out. The aircraft took off at 16:50 hours IST and landed back at 17:10 hours IST. All three dual training sorties were uneventful, with the pilot not encountering any snag/issues with the aircraft.

According to the pilot's statement, after completing the third training sortie, the aircraft's engine was shut down, and as per the procedure, the fuel valves were turned to the closed position. The pilot exited the aircraft and, while heading to the hangar, asked the ground staff to park the aircraft in the hangar.

Meanwhile, three joy ride requests came in. According to the joy rider's (passenger) statement, the joy rider and three of their relatives approached JFI's facility at Dhanbad airport with the intention of booking three joy ride sorties. Initially, JFI's representative refused the request. However, later, JFI's personnel accepted the joy rider's request for three joy ride sorties.

As per the organization's policy, the joy rider (passenger) filed and signed the indemnity bond. The details filed in the indemnity bond indicated that the joy rider was a 16-year-old Indian citizen. The pilot also signed the indemnity bond. The pilot authorized the joy ride sortie and



signed the relevant entry in the 'Daily Flying Authorization Book' maintained at the Dhanbad base. Subsequently, the pilot instructed the ground staff to position the aircraft for flying.

The pilot for the joy ride sortie was the same pilot who had operated the preceding three training sorties of the day on the aircraft VT-GDI. The pilot held a Glider Pilot license with 602 hours of flying experience. According to the pilot's statement, a brief memory-based preflight inspection was carried out and no defects were observed.

Both pilot and the joy rider boarded the aircraft. The joy rider sat in the left-hand side cockpit seat, while the pilot sat in the right-hand side cockpit seat. Both fastened their harnesses, and then the pilot switched on the engine. Within 12 seconds of engine start, the pilot initiated the take-off roll on runway 25. The aircraft rolled for a few seconds and then took off.

The moment the aircraft lifted off, a "Low Fuel Pressure Alarm" message appeared on the cockpit display unit. The aircraft continued to climb to near 100 feet in altitude. Within 14 seconds of the Low fuel pressure message appearing, the aircraft's engine stopped in mid-air, just as the aircraft had climbed to approximately 170 feet in altitude. When the engine stopped, the pilot attempted to restart it and cranked it once. However, the engine did not restart. The pilot did not make a second attempt to restart the engine and took no further action. The pilot also did not alert the joy rider about the prevailing emergency.

Initially, the aircraft headed slightly to the right and then drifted to the left. Thereafter, it continued to descend rapidly with a left heading. When the aircraft descended to a very low altitude, its right wing hit the top of a tree, followed by power lines and the roof of a house. Due to the impact, the aircraft fell and collided with a concrete pillar of the same house, finally coming to rest in a tilted position.

The aircraft's collision sound was so loud that it grabbed the attention of nearby residents. Some locals rushed to the accident site for the rescue. Meanwhile, the pilot exited the aircraft, rescued the passenger, and sent the passenger to a nearby hospital for medical treatment with the help of a local. Subsequently, the pilot informed the organization about the accident and its location via mobile phone.

Upon receiving the accident news, personnel from M/s Jharkhand Flying Institute were activated, and two immediately rushed to the accident site, which was 1 km southwest of Dhanbad airport. When the two M/s JFI's personnel reached the accident site, the pilot moved to the hangar at Dhanbad airport. After reaching the hangar, the pilot first met with his family and later proceeded to the hospital for a medical check-up.

Both the pilot and the passenger suffered injuries, whereas the aircraft sustained substantial damage. There was no fire either pre- or post-impact.

## 1.2 Injuries to Persons

Injuries	Pilot	Passenger	Others
Fatal	Nil	Nil	Nil
Serious	Nil	01	Nil
Minor/ <del>None</del>	01	Nil	Nil

## 1.3 Damage to Aircraft

The aircraft sustained substantial damages due to the accident. Details of the aircraft's damages are given in the section 1.12.

## 1.4 Other Damage

When the aircraft's engine failed and it descended to a very low altitude, the aircraft's right wing hit the top of a tree, trimming some branches. Subsequently, the aircraft clipped the power lines in its path and struck the roof of a house. Due to the impact, the aircraft fell, and the nose section entered the entrance area of the same house, where a concrete pillar sliced into the aircraft cockpit. Consequently, the concrete pillar and the wall of the house were damaged.

## 1.5 Personnel Information

### 1.5.1 Pilot

Nationality		Indian
Date of Joining in the Organization		March 2011
Age		44 Yrs.
License	Type	Pilot's License (Glider)
	Date of Issue	02.09.2011
	Valid up to	01.09.2031
Glider rating		IS 28 M2/GR
Date of Class II Medical Exam & validity		28 February 2023 & 02 March 2025
FRTOL (R) Date of Issue/Validity		06.03.2013 & 05.03.2033
Total Flying Experience		602:08 hours
Last Flown on Type		22 March 2023
Hours flown in last 365 days		49:20 hours
Hours flown in last 6 months		22:55 hours
Hours flown in last 30 days		05:20 hours
Hours flown in last 07 days		01:15 hours
Hours flown in last 24Hr		01:15 hours
Rest period before the first sortie of the day		17:35 hours

The pilot held a valid DGCA Pilot's License (Glider) PL (G). Additionally, the pilot possessed valid Glider Instructor and Examiner authorizations issued by the DGCA to exercise the privileges outlined in the DGCA's Civil Aviation Requirements Section 7, Series I, Part XI, issued on July 13, 2017. The pilot's license was also endorsed by the DGCA with an open rating stating, *"An open rating to fly all gliders having an all-up weight not exceeding six hundred kg."*

#### **1.5.2 Individual Factor**

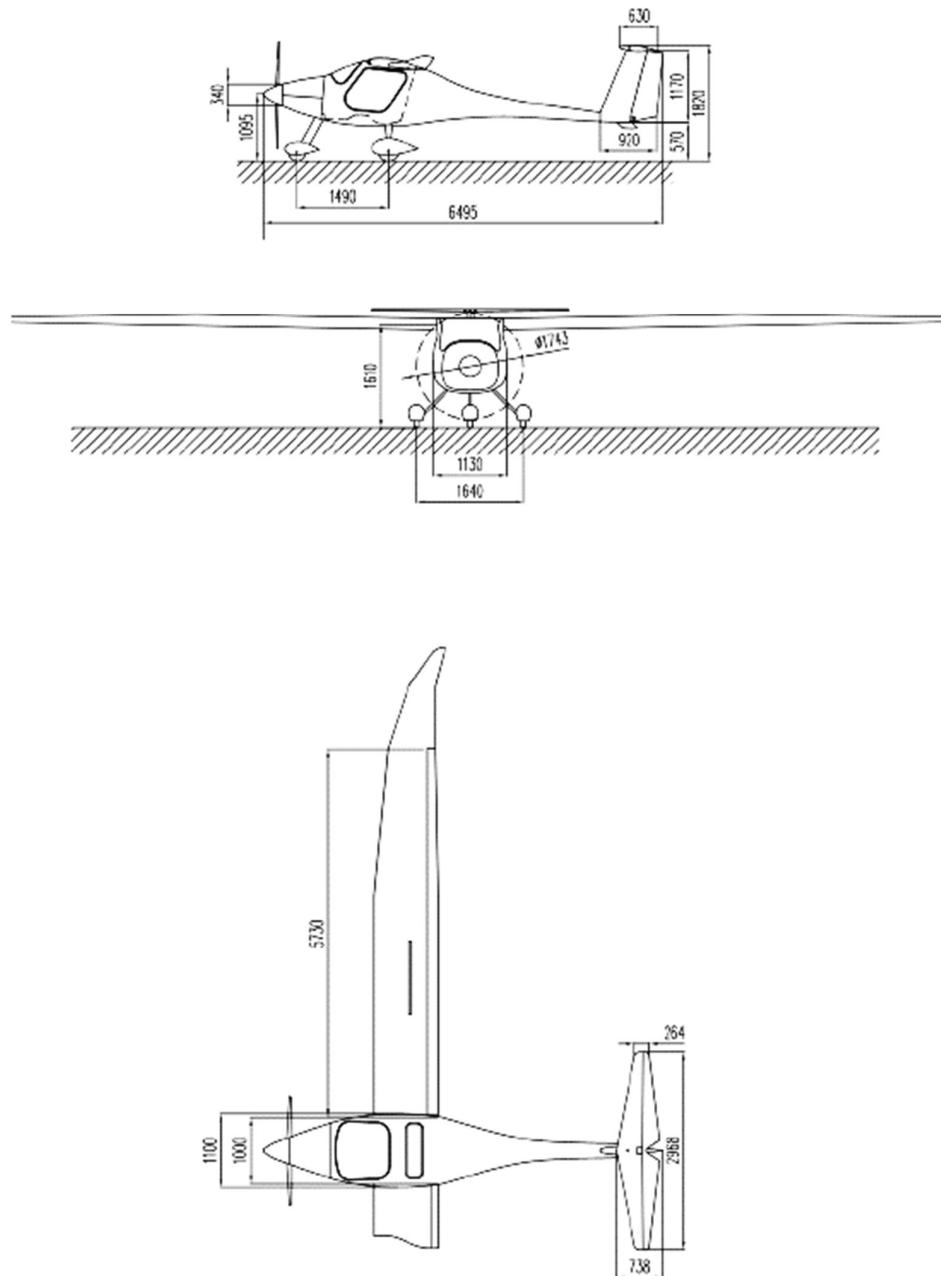
As per the Pilot's statement, the pilot owned a pet shelter that provided shelter and food to abandoned and rescued pets. On the morning of the incident, one of the pets died. After completing the forenoon training sortie, the pilot went home to perform the last rites for the pet. The pilot personally buried the deceased pet's body. On the way back, as the hangar was on the route to home, the pilot's family accompanied the pilot. This arrangement was made so that they could all return home together after completing the remaining training sortie.

As per pilot statement, the pilot had a strong affection for pets. On the day of the incident, the pilot was particularly upset due to the death of one of his pets.

## 1.6 Aircraft Information

### 1.6.1 General Information

Sinus is a 15-meter-wingspan, two-seat T-tail motor glider made almost entirely of composite materials. Its low-drag, high-wing-monoplane, engine-at-the-front construction makes it a perfect glider when flying unpowered. In fact, the propeller can be feathered to reduce drag even more.



**Figure 1: Three dimensions (Courtesy to Sinus POH)**

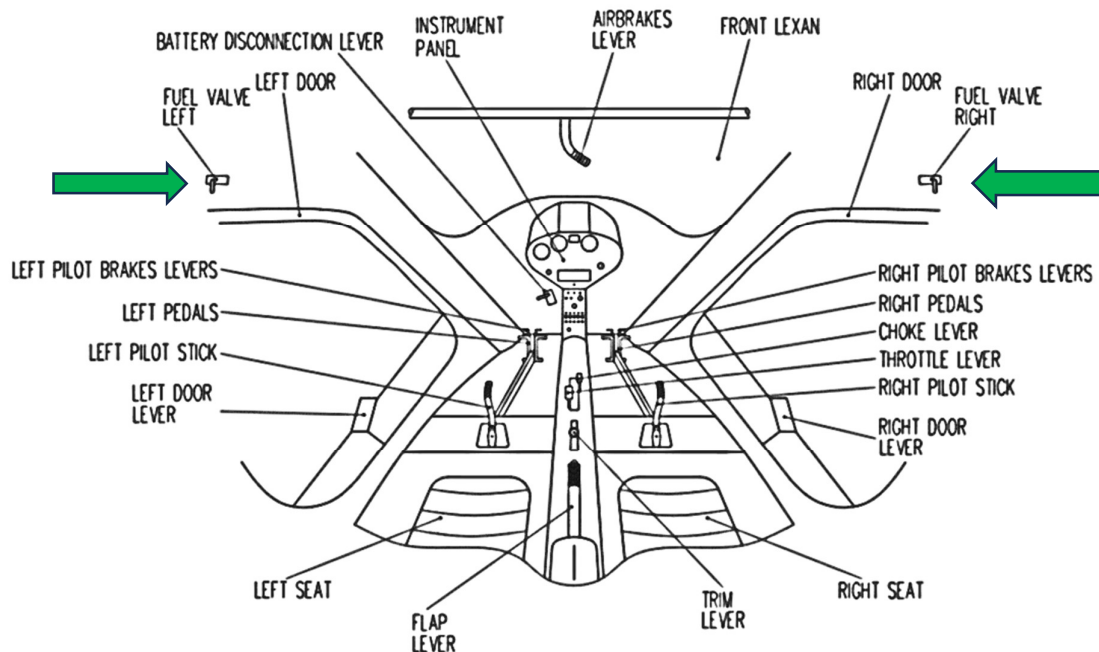
Sinus features flaperons, interconnected flaps and ailerons presented in the same deflecting surface. Flaps offer 4 settings: neutral, 1st, 2nd and the negative position of which none have any impact on aileron deflections whatsoever. Individual main flight control levers make Sinus ideal for initial as well as for advanced flight training. All aileron, elevator and flap controls are connected to the cabin controls using self-fitting push-pull tubes. Rudder deflects via cables. The elevator trim is mechanical, spring type.

All glass surfaces are made of 2 mm anti UV GE Lexan, which was specially developed not to shatter or split on impact.

Main wheel brakes are disc, hydraulic type. The hydraulic brake fluid used is DOT 4. Cabin ventilation is achieved through special ducts fitted onto glass doors, cabin heating, however, is provided utilizing of hot air from the engine.

To enhance aerodynamics even more the aircraft is equipped with special wheel fairings and the propeller spinner. Aircraft is also equipped with a VARIO propeller, offering in-flight variable pitch.

Electric circuit enables the pilot to test individual circuit items and to disconnect the entire wiring but leave the engine running, should there come to a distress situation. Navigational (NAV), anti-collision (AC) and landing (LDG) lights are installed. The firewall is enforced by heat and noise insulation.



**Figure 2: Cockpit Layout (Courtesy to Sinus POH)**

Basic instruments come installed with operational limits pre-designated. Also, signal lights indicating danger zones are provided. A basic cockpit layout is depicted in the figure 2.

### 1.6.2 Aircraft VT-GDI Specific Information

Aircraft Model	Sinus 912 Motor Glider
MSN	407 SN 912
Year of Manufacturer	2011
Name of Owner	M/s Aero club of India
C of R (validity)	31.12.2023
C of A	Valid
Category/Sub Division	Normal/Passenger
A R C issued (Issued/Validity)	24.02.2023/01.01.2024
Aircraft Empty Weight	309.50 Kg
Maximum Takeoff weight	472.50 Kg
Date of weighment	18.07.2011
Max Usable Fuel	40.32 Kg
Empty Weight C. G.	243.46 mm aft from datum (CG= 20.07% MAC)
Total Aircraft Hours	933:41 Hours
Last Scheduled inspection on Airframe	100 hrs. / Annual Inspection done on 27.02.2023.
List of Repairs carried out after last major inspection till date of accident	Nil
Engine Type	Rotax 912
Date of Manufacture	2011
Engine Sl. No.	4410907
Engine Hours	934.01 hrs (TSN)
Last Scheduled inspection on Engine	100 hrs. / Annual Inspection done on 27.02.2023.
List of Repairs carried out after last major inspection till date of accident	Nil
Propeller Manufacturer	Pipistrel
Propeller Model No.	1153118
Propeller Type	VARIO
Aero mobile License (Valid till)	31.12.2023
AD, SB, Modification	All applicable complied

The Aircraft was registered in “Normal” category & Subdivision - “Passenger”. The C of A and ARC were valid at the time of accident. As per DGCA CAR Section 2, Series ‘X’, Part II, the aircraft weight schedule was re-computed based on the weighing done on 18.07.2011 by the OEM in Slovenia. The recomputed weight was approved by O/o Deputy Director General, DGCA, Kolkata on 14 September 2018.

**Aircraft Maintenance:** Maintenance activities on the aircraft were being carried out by a DGCA approved CAR 145 organization (M/s Redbird Airways), under the maintenance contract at Dumka base. During the investigation, aircraft’s maintenance records were examined and following salient points have been observed:

- i. 100 hrs. / Annual Inspection was the last scheduled inspection carried out, on the aircraft at 926:37 airframe hours (TSN) on 27 February 2023 at Dumka. Nil observation was found during the above-mentioned inspection.
- ii. The aircraft had logged 07:04 hrs., since the last Scheduled inspection.
- iii. During the 100 hrs. / Annual Airframe Inspection Schedule fuel system related checks were also performed and nil abnormality was recorded in the completed task card.
- iv. As per 100 hrs. / Annual Airframe Inspection task card, fuel system was checked for proper condition, to identify any leakage and gascolator filter was also cleaned.
- v. Similarly, 100 hours / Annual Inspection was the last scheduled inspection carried out on the engine at 926:57 engine hours (TSN) on 27 February 2023 at Dumka. Nil observation was found during the aforesaid inspection.
- vi. The engine had logged 07:04 hours, since the last Scheduled inspection.
- vii. During the 100 hours / Annual Inspection Schedule (Engine) inspection, the engine was inspected as per task card. Inspection pertaining to magnetic plug, carburetor, spark plug and exhaust system were also carried out as per task card. After satisfactory inspection engine ground run was carried out.
- viii. After satisfactory completion of the 100 hours / Annual Inspection, a Certificate of Release to service (C.R.S) was issued by a Company Authorized AME.
- ix. 100 hours / Annual Inspection radio was carried out on 18 February 2023 and ELT monthly test was carried out on 18 March 2023 at Dumka.
- x. Last C.R.S prior to accident was issued for the First Aid Kit (FAK) installation after recertification by a MBBS doctor on 22 March 2023.

All concerned Airworthiness Directives, mandatory Service Bulletins, DGCA Mandatory Modifications on this aircraft and its engine have been complied with. As per records made in the aircraft logbook, the last Service Bulletin complied on the aircraft was SB 100-00-80-013 at Dumka on 26.02.2022.

As per aircraft's records, on 23 March 2023, the Daily Pre-flight Inspection was carried out by an AME and during the Pre-flight inspection no abnormality was observed. Before the first sortie of the day, fuel quantity available on board was 27 liters and no fuel was uplifted before first sortie. After completion of second sortie on pilot's demand, 10 liters of fuel was uplifted in the aircraft.

As per entries made in the aircraft's technical logbook, no snag was pending for rectification as on the date of accident. In addition, as per statement given by the AME, nil snag was pending for rectification on the aircraft VT-GDI.

As per Pilot statement, **Load and trim sheet for the joy ride sortie was not prepared.** Whereas DGCA CAR Section 2 series 'X' Part II, states that the Pilot-in-Command is responsible for preparing the same. The relevant extract for the same is appended as figure 3.

## **9. COMPUTATION OF CENTRE OF GRAVITY:**

9.1 For all flights, it shall be the responsibility of the Pilot-in-Command to ensure that the aircraft is satisfactorily loaded with respect to the total load, the distribution of the load and proper securing of the load in aircraft (lashing of the load). The distribution of the load shall be such that the C.G. position will remain within the specified limits at the time of take off, during the progress of the flight and at the time of landing.

***Figure 3: Extract from DGCA CAR***

Further, the DGCA CAR Section 2 series 'X' Part II states that the load and trim sheets shall be prepared, verified and signed by the Pilot-in-Command before the commencement of the flight. The relevant extract is as appended below:

9.4 Every operator including scheduled, non-scheduled, State Government and private aircraft operator shall prepare load and trim sheet for aircraft where the manufacturer has provided necessary documentation for the purpose. The load and trim sheet shall indicate the composition and the distribution of the total load carried on board the aircraft as well as the calculated C.G. position for "take-off and landing" configurations before the commencement of the flight. Such load sheets shall be prepared and signed by the Pilot-in-Command or persons duly trained in accordance with CAR Section 8 Series 'D' Part I and responsible for supervising the loading of aircraft. In case the load and trim sheet is prepared by a person other than the Pilot-in-Command, the same shall be submitted to the Pilot for his scrutiny and signatures before the commencement of the flight. One copy of the load sheet shall be carried on board the aircraft and one copy shall be retained by the operator for record purposes for a period of atleast four months from the date of issue.

**Rev. 9, 17<sup>th</sup> January 2023**

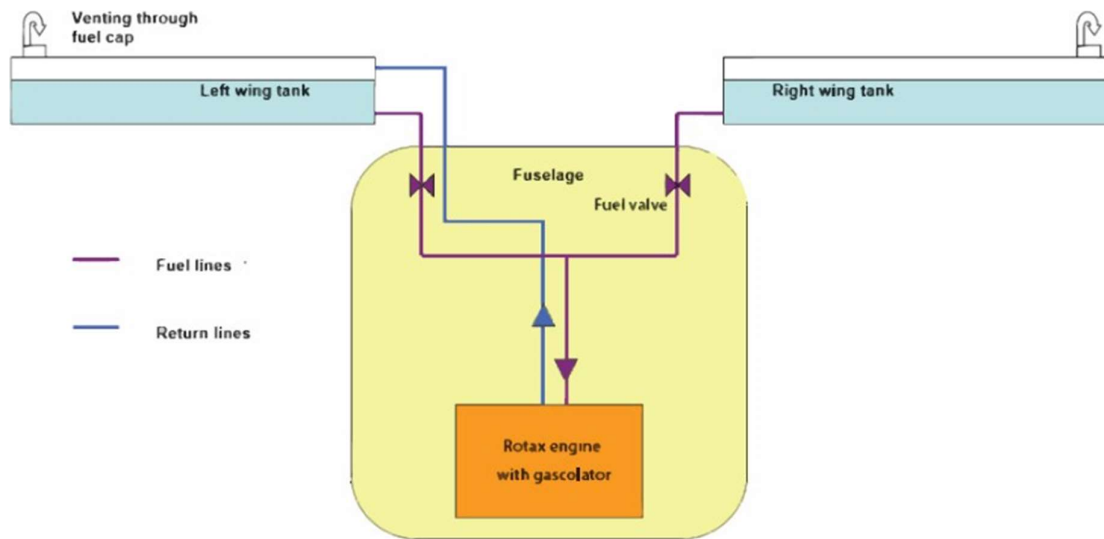
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***Figure 4: Extract from DGCA CAR***

During the investigation, as per aircraft's POH, computation of Centre of Gravity was carried out by a type rated pilot to ensure the center of gravity (CG) limits. CG was found within the OEM limits.

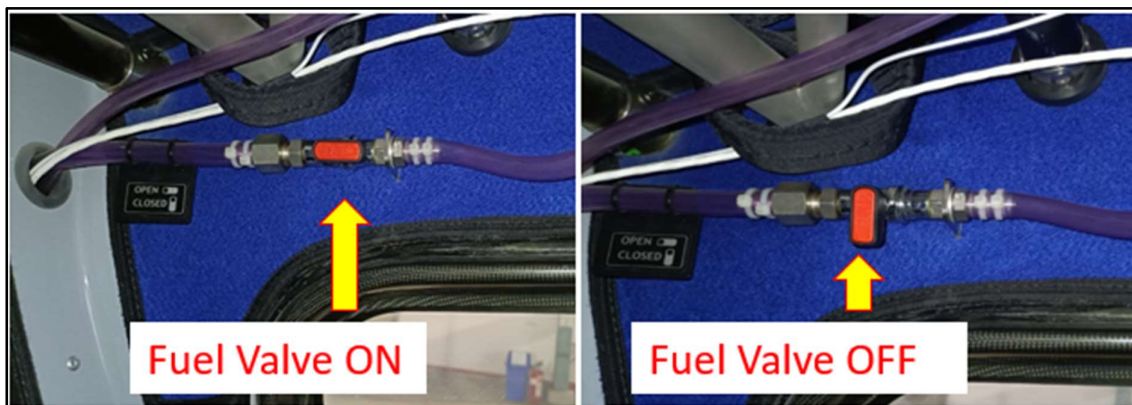


### 1.6.3 Aircraft Fuel System



**Figure 5: Fuel System**

The aircraft is equipped with two integral fuel tanks and are located inside the wings i.e., one in each wing (Please refer figure 5). The maximum stored fuel quantity is 60 L (15.9 US gal) for the standard tanks. Two (left and right) transparent vertical tubes, which are visible from the pilot position and connected to the highest and lowers points of each respective tank, serve as a visual indicator of the fuel quantity available. Venting of the fuel tanks is through the fuel caps.



**Figure 6 Fuel Valves.**

Fuel selector is in the form of two separate fuel valves, located on the left and right upper wall of the cabin (Please refer figure 2 & 6). Fuel hose connectors are self-securing - this prevents fuel spills when disassembling the aircraft. The gascolator is located beneath the lower engine cover. Refueling can be done by pouring fuel through the reservoir openings on top of the wings or by using an electrical fuel pump instead. An important feature is low-fuel signal lights on the instrument panel.

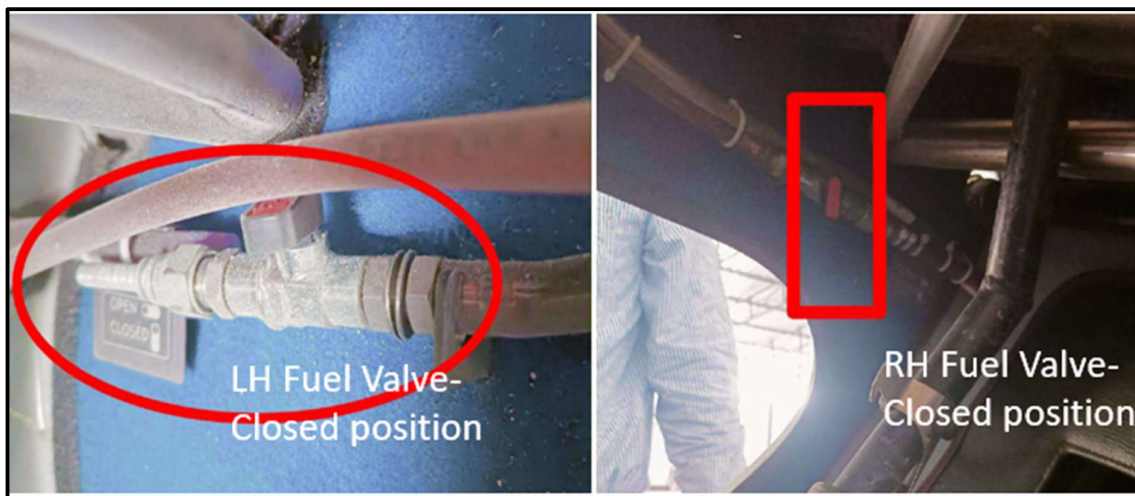
The fuel distribution system consists of thermoplastic polyurethane fuel hoses in the fuselage and rubber hoses in the engine compartment. The latter are protected with either a certified glass Teflon coating or heat-resistant sleeve.

After leaving the wing tank the fuel goes through a shut off valve (one per tank), located on the wing root. Thereafter feed fuel lines join below the cabin floor and the fuel is directed through the firewall to the engine compartment. There the fuel is fed through a gascolator, which has a drain valve, before being directed to the engine pump. The gascolator removes water that may be in the fuel and filters out any debris/foreign material.

Because of aircraft's high wing configuration, the fuel system is completely gravity-fed, always ensuring adequate fuel pressure.

The system features a fuel return circuit and a gascolator that's located on the bottom port side of the engine bay.

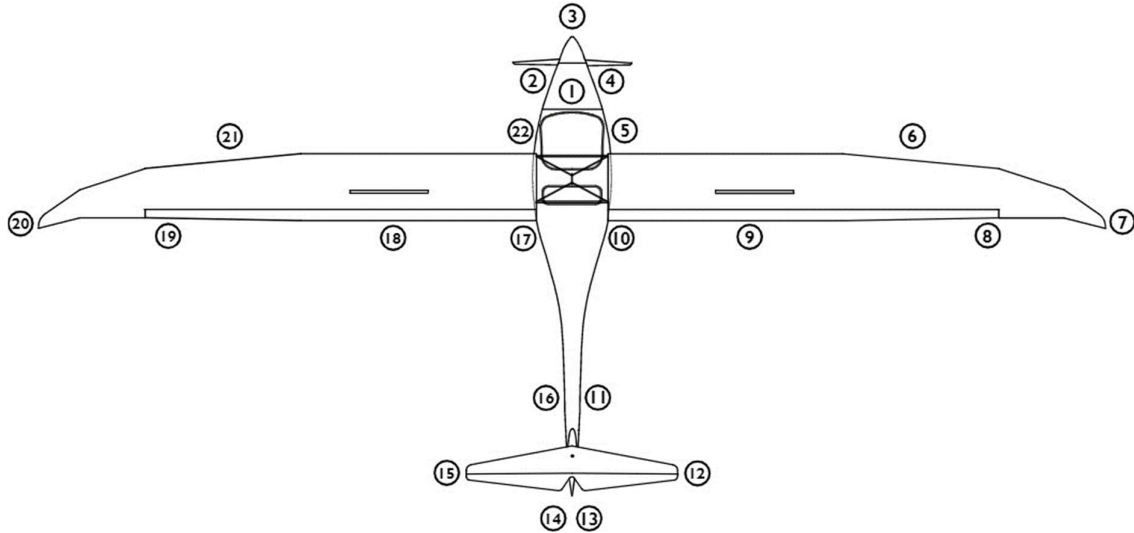
During the onsite inspection, both fuel valves were found in closed position (Refer below pictures). It was also confirmed by the company personnel, who reached the accident site first that nobody has entered cockpit after the accident.



**Figure 7: Actual position of Fuel valves.**

#### 1.6.4 Preflight Inspection as per OEM

An exhaustive Preflight Inspection with schematic is given in the Normal procedure chapter of the Sinus aircraft's Pilot Operating Handbook (POH). The Schematic given in the POH is appended below:



**Figure 8: Schematic of preflight check-up**

**Table 1: Aircraft Inspection Area**

1. Engine, engine cover	9. Right spoiler	17. Fuselage (LH side)
2. Gascolator	10. Fuselage (RH side)	18. Left spoiler
3. Spinner	11. Fuselage, continued (right)	19. Left wing - trailing edge
4. Propeller	12. Hor. tail surfaces (right)	20. Left wingtip, lights
5. Undercarriage, RH wheel	13. Vert. tail surfaces (right)	21. Left wing - leading edge
6. Right wing - leading edge	14. Vert. tail surfaces (left)	22. Undercarriage, LH wheel
7. Right wingtip, lights	15. Hor. tail surfaces (left)	
8. Right wing - trailing edge	16. Fuselage, continued (left)	

A relevant warning is also given by the OEM in the beginning of this chapter for safety and same is appended below:

***“WARNING! Every single check-up mentioned in this chapter must be performed prior to EVERY FLIGHT, regardless of when the previous flight took place!”***

*It is also mentioned that the person responsible for the preflight check-up is the pilot from whom it is required to perform the check-up in the utmost thorough and precise manner. Provided the status of any of the parts and/or operations does not comply with conditions stated in this chapter, the*

*damage MUST be repaired prior to engine start-up. Disobeying these instructions may result in serious further damage to the plane and crew, including injury and loss of life!*

As per the Preflight inspection procedure mentioned in the POH, the Pre-flight inspection is exhaustive, and it requires at least 5-10 minute time to complete it thoroughly.

As per Pilot statement, before operating the Joy ride sortie a brief memory based Preflight Inspection was carried out and no abnormalities were found. However, the Pilot could not provide any documentary evidence to support the above statement regarding Pre-flight Inspection.

### 1.6.5 Engine Start-Up Procedure

Engine start-up procedure is subdivided in three simple steps viz. **Before engine start-up, Engine start-up and Engine warm-up procedure** in the Normal procedure chapter of the Sinus aircraft's Pilot Operating Handbook (POH). The relevant portion from the POH is appended below:

<b>Before start-up</b>		<b>Before takeoff</b>	
Fuel system drain	PERFORMED	Fuel valves / Fuel selector	BOTH OPEN / SELECT FULLEST TANK
Doors	CLOSED	Spoilers	RETRACTED
Rudder pedals & hear rest position	SET	Doors	CLOSED
Harnesses	FASTENED	Flight controls	CHECKED
Parachute rescue system safety pin	REMOVED	Flaps	2 <sup>nd</sup> POSITION
Pitot tube protection cover	REMOVED	Elevator trim	SET
Spoilers	RETRACTED	Propeller pitch	SET
Brakes	SET	<b>After takeoff</b>	
Flaps	2 <sup>nd</sup> POSITION	Elevator trim	SET
VARIO propeller lever	MINIMUM PITCH	Flaps	UP
Battery switch	ON (PUSH)	Fuel selector (if installed) SWITCH EVERY 30 MIN	
Instruments	CHECKED	<b>Descent - Approach</b>	
COM, NAV	SET	Throttle	IDLE
<b>Engine start-up</b>		Flaps	1 <sup>st</sup> POSITION
Area in front of aircraft	CLEAR	Instruments	SET
Fuel valves / Fuel selector	BOTH OPEN / SELECT FULLEST TANK	Spoilers	AS DESIRED
Throttle	IDLE	<b>Landing</b>	
Choke	AS NEEDED	Throttle	IDLE
Master switch	ON	Flaps	2 <sup>nd</sup> POSITION
Magnetos	ON	Spoilers	AS DESIRED
AC lights	ON	<b>Shutdown</b>	
<b>After start-up</b>		Brakes	SET
Warm up at	2500 / 3500 RPM	Spoilers	RETRACTED
Magneto RPM drop	VERIFIED	Flaps	UP
Engine & Propeller check	RPM within limits	AC lights	OFF
		Magnetos	OFF
		Master switch	OFF
		Fuel valves / Fuel selector	CLOSED / OFF

**Figure 9: Extract from OEM**

### **a) Before Engine Start-Up**

*CAUTION! To ensure proper and safe use of aircraft it is essential for one to familiarize with engine's limitations and engine manufacturer's safety warnings. Before engine start-up make sure the area in front of the aircraft is clear. It is recommended to start-up the engine with aircraft's nose pointing against the wind.*

***Make sure the fuel quantity will suffice for the planned flight duration.***

*Make sure the Pitot tube is uncovered and rescue parachute safety pin removed. Engage wheel brakes, or parking brake.*

### **b) Engine Start-Up**

***Make sure both fuel valves are open/select fullest tank with fuel selector and master switch in OFF position (key full left).***

*Set propeller pitch to flat (prop. pitch screw to the left fully).*

*Should the engine be cold, apply choke (lever full back).*

*Set master switch ON (key in full right position). Set both magneto switches ON.*

*Engage engine starter and keep it engaged until the engine starts.*

*For ..... four-stroke engines to 2500 RPM. Slide the choke lever forward gradually.*

*CAUTION! When the engine is very cold, the engine may refuse to start. Should this occur, jerk the choke handle fully backwards and hold it there for some 20 seconds to make mixture richer.*

### **c) Engine Warm-Up Procedure**

*A two-stroke engine should be warmed-up at 3500 RPM, a four-stroke, however, at 2500 RPM up to the point working temperature is reached.*

*Warming-up the engine you should:*

- 1      *Point aircraft's nose against the wind.*
- 2      *Verify the engine temperature ranges within operational limits.*

*CAUTION! Avoid engine warm-up at idle throttle as this causes sparks to turn dirty and the engine to overheat.*

*With wheel brakes engaged and control stick in full back position, first set engine power to 3500 RPM (two-stroke engine) or **4000 RPM (four-stroke engine) in order to perform the magneto check.** Set the magneto switches OFF and back ON one by one to verify RPM drop of not more than 250 RPM (two-stroke engines) or 300 RPM (four-stroke engine).*

*When the magneto check has been completed, add full power (throttle lever full forward) and monitor engine's RPM. Make sure they range between maximum recommended and maximum allowable RPM limits.*

However, as per the pilot statement, the pilot did not adhere to the engine start up procedure as mentioned in the POH.

#### **1.6.5 Take-Off and Initial Climb**

Take-off and initial climb section in the Normal procedure chapter of the Sinus aircraft's Pilot Operating Handbook (POH) requires to verify certain things and that includes Fuel valves. It states Fuel valves: fully open/fullest tank open.

Aforementioned POH procedure underlines the importance of verifying fuel valves position before take-off. However, as per pilot statement, pilot was not sure about the fuel valves positions before take-off or initial Climb.

#### **1.6.6 Emergency Procedures**

Engine failure in flight is discussed in the Emergency procedure chapter of Sinus 912 aircraft's Pilot Operating Handbook (POH). The relevant extract from the same is appended below:

*"First ensure proper airspeed by reducing angle of attack, then start analyzing terrain underneath and choose in your opinion the most appropriate site for landing out.*

**WARNING!***The decision where to land when landing is FINAL! DO NOT change your mind even if you happen to come across a different, perhaps more appropriate landing site.*

*Provided the engine failed aloft, react as follows:*

*Make sure the master switch is in the ON position (key full right), magneto switches both set to ON and **both fuel valves OPEN** / Fuel selector to the fullest tank.*

*Should the propeller not be spinning (motor blocked!), the engine is probably seriously damaged. In this case DO NOT attempt to restart the engine. Instead begin with the landing out procedure immediately.*

*Should the propeller be spined by air current freely, fuel or electrical system is probably malfunctioning. **Verify on-board fuel quantity and make sure both fuel valves are open** / Switch tanks on fuel selector and magneto switches set to ON. Restart the engine."*

**The POH procedure underlines the importance of verifying fuel valves position after an engine failure in-flight. However, as per pilot statement, pilot did not check the fuel valves position after engine failure.**

### 1.6.7 Recreating the Accident: Ground Simulation of Inflight Conditions.

In the aircraft's manual the OEM has recommended a specific engine startup, warm-up, take-off and initial climb procedures to ensure efficient and safe operation. After the accident an exercise was carried out on another Sinus 912 motor glider fitted with Rotax 912 engine, to understand the engine responses, when both fuel valve were kept in off position. The observations made during this exercise are as mentioned below:



**Figure 10: Screen shot of Aircraft Display Unit**

- a) Engine started at  $t = 0$  second.
- b) Display unit turned ON after  $t = 10$  second
- c) Low Fuel Pressure Alarm triggered at  $t = 17$  second. (Refer below figure 1)
- d) Engine stopped at  $t = 45$  second. (Refer below figure 2 and 3). Propeller blade position after the engine stopped due to fuel starvation.
- d) Engine restart was carried out. The propeller turned but engine did not reignite. (Refer below figure 4). The propeller blade after few rotations stopped at a new position.

Subsequently, fuel valves have been opened and engine start was attempted to understand how much time it will take for starting. **The engine restarts within 12-15 seconds.**

### 1.7 Meteorological Information

Meteorological information obtained by the pilot from meteorological website at 10:47 hours IST and 15:00 hours IST on 23 March 2023 at Dhanbad Airport.

Time (IST)	Wind	Visibility (m)	Gust	Weather	Clouds	Temp (°C)	Dew (°C)	QNH (hPa)	Trend
1047	320/04 kts	5000	nil	NSC	5000 Hz NSC	25	13	1014	No SIG
1500	260/03 kts	5000	nil	NSC	NSC	25	10	1016	No SIG

Meteorological station or airport meteorological office of Indian Meteorological Department (IMD) was not situated at Dhanbad airport. Consequently, M/s JFI did not have any meteorological recording/monitoring facility at Dhanbad airport. Hence, M/s JFI's Pilots flying at Dhanbad airport were fully dependent upon the meteorological information available on various weather information providing website. As per the Pilot statement, while undertaking the joy ride sortie weather was clear and calm for flying.



The sunset timing, on **23 March 2023** was **17:56 hours IST**.

### **1.8 Aids to Navigation**

Dhanbad airport was not equipped with any radio Navigational Aids, except for a wind shock located on the left-hand side of runway 25.

### **1.9 Communications**

Dhanbad airport did not have any ATC facility and no VHF frequency was allocated to Dhanbad airport. However, as per organization's practice prior to take-off, the organization request permission from the nearest military flying base for certain fixed time duration. M/s JFI did not have any VHF frequency/communication facility to establish contact with its aircraft flying at Dhanbad airport. Hence, at the time of accident the aircraft was not in the contact of any ground station or ATC.

### **1.10 Aerodrome Information**

Dhanbad aerodrome is in Barwadda, Jharkhand, India. Dhanbad aerodrome is an uncontrolled aerodrome. Civil Aviation Department, Government of Jharkhand is responsible for Operation and Management at Dhanbad airport. The ICAO and IATA Code for Dhanbad Airport are VEDB and DBD respectively.

Latitude/Longitude : 23°50'02" N / 86°25'31" E

Airport Elevation : 258m/847 ft

Runway dimension : 1128 m X 28 m

Runway Orientation : 07/25

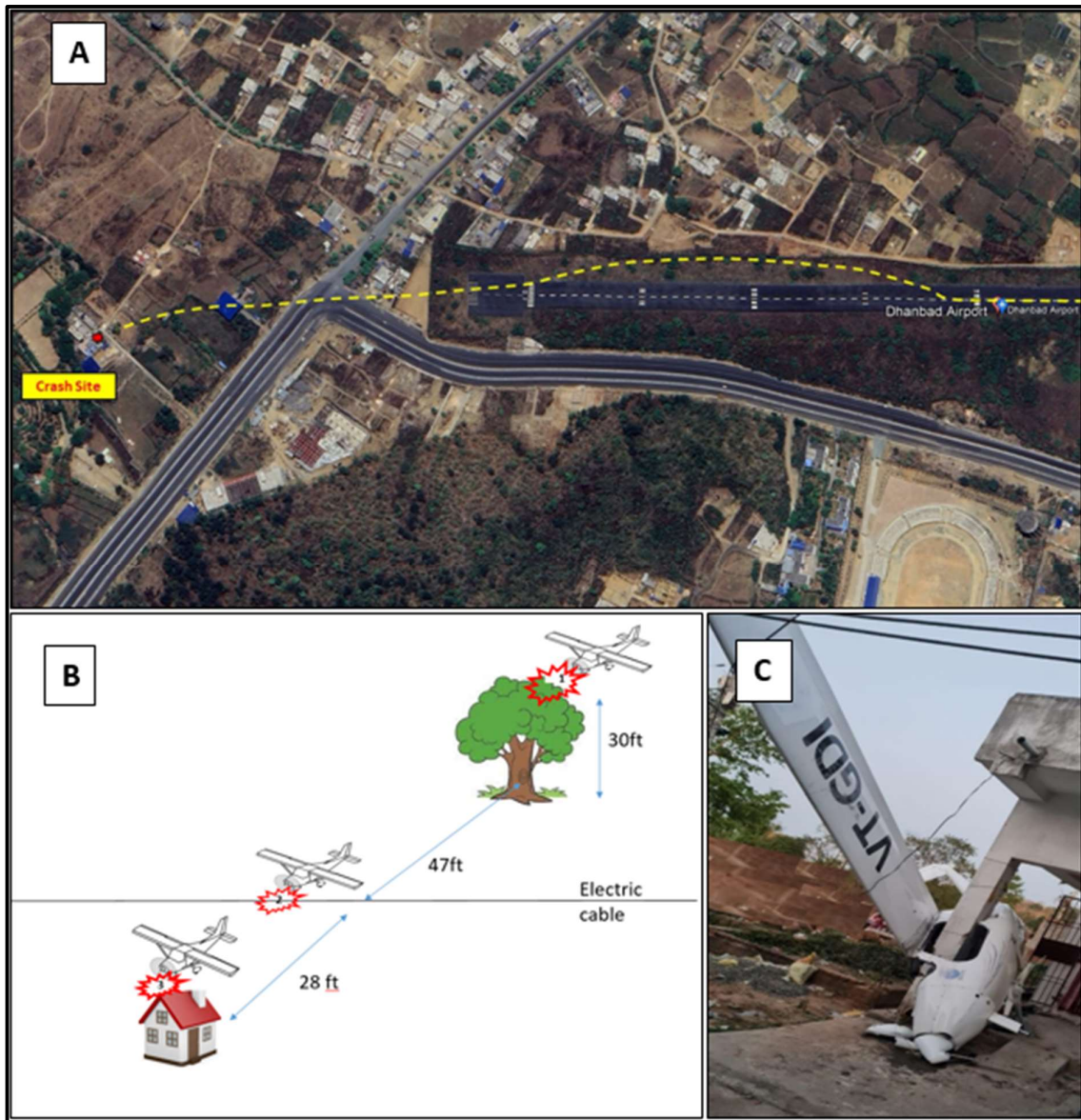
### **1.11 Flight Recorders**

The maximum all up weight of the Sinus 912 Motor Glider aircraft equipped with a Rotax 912 engine is 472.50 kg. Therefore, the aircraft VT-GDI was neither required to be fitted with Cockpit Voice Recorder (CVR) nor Digital Flight Data Recorder (DFDR) in accordance with Para 4.1 of DGCA CAR Section 2, Series I, Part VI and Para 4.2 of DGCA CAR Section 2, Series I, Part V. During the investigation, no Cockpit Voice Recorder (CVR) or Digital Flight Data Recorder (DFDR) was found installed on the aircraft.



## 1.12 Wreckage and Impact Information

### a) Impact information



**Figure 11: Aircraft's Track and Final resting position**

When the aircraft's engine stopped in air, initially, the aircraft headed slightly towards the right side and then drifted towards left. Thereafter, the aircraft continued to descend rapidly with left heading. When the aircraft descended to a very low altitude, its right wing hit 30 ft high tree on its way. Consequently, a portion of RH wing was disintegrated from the aircraft and was hanging on the tree branches. Aircraft's second impact was with the electric cable. The electric cable was clipped due to aircraft's impact. Subsequently, aircraft made the third impact with a roof of the house. After impact with roof aircraft fell at the entrance area of that house, where a concrete pillar sliced in the aircraft's cockpit from LH side. Finally, the aircraft came to rest in inverted position. Above figure 'A' depicts the aircraft's course, figure 'B' depicts the aircraft's Final trail and figure 'C' depicts the aircraft's final resting position.

### **b) Wreckage information**

Most of the wreckage was confined to one place i.e., at the aircraft's final resting position, except few aircraft parts which were sheared off due to impact such as right-wing tip portion was found at the bottom of the tree, nearly 70 ft. away from the final resting position and some portion of right wing was found hanging on the top of the tree.



**Figure 12: Separated parts of Aircraft's RH wing**

### **C) Damage to the Aircraft**

During the accident the aircraft sustained substantial damages. The following are some major damages sustained by the aircraft.

1. One Propeller blade was found broken in two pieces & other one suffered minor damage, refer figure 13(5).
2. The nose wheel fork was found broken from the attachment point, refer figure 13(4).
3. Both main wheel struts were found broken from the attachment point. However, wheels were found intact on axel, refer figure 13(3).
4. The right wing was found broken from the root section and was found in multiple pieces, refer figure 13(6) & 13(7).
5. The Left-wing root section point was found intact with minor damage.
6. The cabin section was found completely damaged, refer figure 13(1).
7. The front windshield and both windows were found shattered.
8. Fuselage was found broken from middle portion, refer figure 13(2).
9. The horizontal stabilizer and elevator were found intact with minor damages.
10. The vertical stabilizer and rudder were also found intact with minor damage.





**Figure 13: Damages to the Aircraft**

**d) Post accident wreckage examination:**

During the on-site visit by the preliminary investigation team, both fuel valves were found in a closed position. During investigation, M/s JFI's staff, who reached the accident site first had submitted to the preliminary investigation team that none of them accessed any of the aircraft controls, switches, valves etc. However, only one person of M/s JFI, had accessed the aircraft wreckage post-accident, to take out the keys.

During the investigation, the aircraft wreckage was thoroughly examined and pre-crash impact leakage or blockage in the aircraft's fuel system was ruled out.

**1.13 Medical and Pathological Information**

As per the organization's practice, Pilots flying at Dhanbad airport base do not undergo pre-flight Breath Analyzer (B.A) test and they only sign a B.A declaration in a register maintained by the organization. Therefore, on the day of accident the Pilot had not undergone the pre-flight Breath Analyzer (B.A) test and signed the B.A declaration in the register.

CIVIL AVIATION REQUIREMENTS SERIES F PART III	SECTION 5 - AIR SAFETY 4TH AUGUST 2015
3.2 Indian Non-scheduled/ private category operators/ flying training institutes, etc.	
3.3 Central Government and State Government Civil Aviation Departments, Public Sector companies under Centre and State Government.	
CIVIL AVIATION REQUIREMENTS SERIES F PART III	SECTION 5 - AIR SAFETY 4TH AUGUST 2015
4.3.6 Flying training institutes, shall ensure that:	
a) Each instructor shall undergo pre-flight breath-analyzer examination before undertaking first flight of the day.	
b) At least 40% of student pilots shall be subjected to Pre-flight breath-analyzer examination for alcohol consumption and this percentage shall be on daily basis.	
c) Breath-analyzer examination shall be recorded on camera and recording shall be preserved for six months.	

**Figure 14: Extract from DGCA CAR**

The DGCA CAR Section 5, Series F Part III dated 04<sup>th</sup> August 2015 outlines the mandatory requirements for the Pre-flight Breath Analyzer (B.A) test. As per applicability mentioned in Para 3.3 of the above mentioned DGCA CAR, the CAR was applicable to the State Government Civil Aviation Departments i.e., it was applicable to M/s JFI. Further Para 4.3.6 of the above mentioned DGCA CAR outlines the Pre-flight Breath Analyzer (B.A) test requirements for Flying training institutes in detail. Relevant extract from DGCA CAR is appended in the above figure 14.

On the day of the accident, flying operations at Dhanbad Airport were managed by M/s JFI. As the accident occurred near the airport, M/s JFI was responsible for ensuring the post-accident medical examination of the crew. After the accident, the pilot was taken to a nearby hospital for treatment and a medical checkup, but the examination to determine alcohol consumption was not conducted. **However, Para 10 of DGCA CAR Section 5, Series F, Part III dated 04<sup>th</sup> August 2015, mandates the requirement of medical examination of the Pilots immediately after an accident to ascertain the consumption of alcohol. The same was not adhered by M/s JFI.** The relevant extract from DGCA CAR is appended as figure 15.

#### 10. MEDICAL EXAMINATION AFTER ACCIDENT

10.1 In the event of an accident at an airport or in its near vicinity, the Officer In-charge of the airport shall ensure that the crew members are immediately subjected to medical check-up for consumption of alcohol. The doctor conducting such check-up shall take samples of blood, urine, etc. required for detailed chemical analysis. Such examination and collection of samples shall be done at the Airport Medical Centre, wherever available.

10.2 In case where medical centres are not available at the airports or when the condition of crew members requires immediate hospitalisation, Aerodrome Officer In-charge shall ensure that the sample of the blood, urine, etc. is taken at the nearest hospital. These checks should be expeditiously carried out without any loss of time.

10.3 In case where accident is at a location far away from the airport and the police authorities are able to reach the site before the aerodrome authorities and the crew members are alive, the procedure for collection of blood/urine samples shall be performed by the police at the nearest hospital. Such samples shall be properly preserved.

10.4 For the purpose of chemical analysis, the sample may be forwarded to local forensic laboratory giving the details of tests to be conducted, names of flight/cabin crew, etc.

**Figure 15: Extract from DGCA CAR**

#### 1.14 Fire

There was no fire pre- or post-accident.

#### 1.15 Survival Aspects

When aircraft's engine failed in air, the Pilot did not inform the Joy ride passenger regarding the prevailing emergency or about the probable forced landing. The Pilot only asked the passenger to hold the harness firmly that too a moment before the collision.

As the passenger was totally unaware of the probable collision and did not secure himself before the impact. Moreover, the passenger was sitting on the left-hand seat and the pillar sliced in the aircraft's cockpit from LH side, hence, the passenger had suffered severe injuries. Whereas, the Pilot suffered minor injuries.

After the accident, the Pilot came out of the aircraft on its own whereas the passenger came out of the aircraft with the Pilot assistance.

ELT got activated due to the impact. Consequently, the organization received a distress call regarding VT-GDI from the INMCC. Further, the Pilot also called the organization and passed the accident information.



## 1.16 Tests and Research

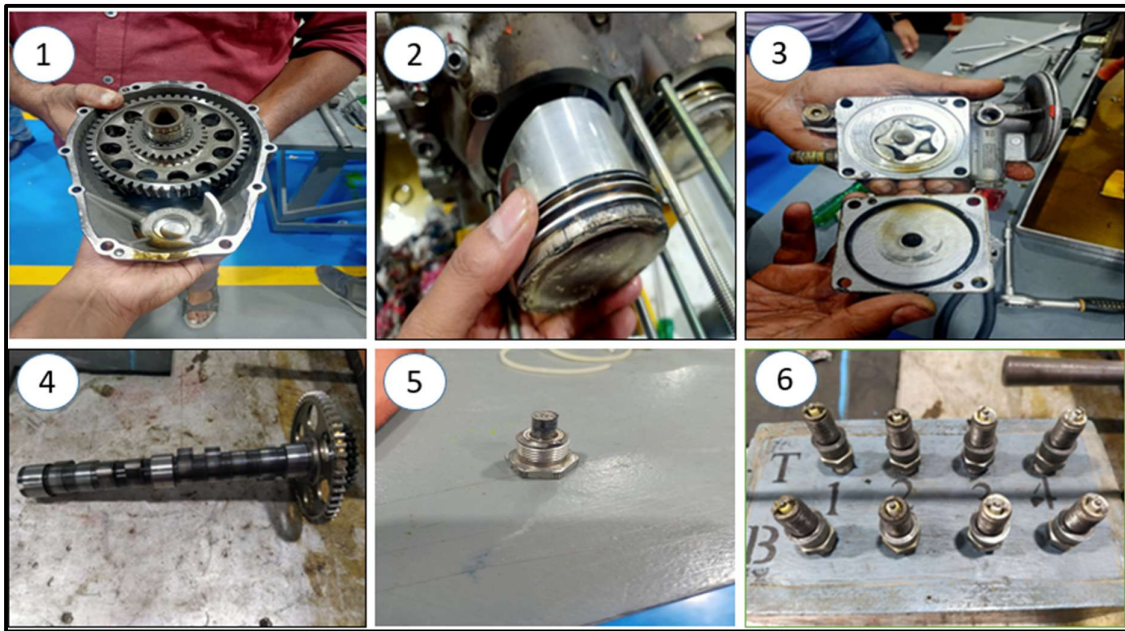
### 1.16.1 Fuel & Engine Oil Sample Report

The Fuel sample collected from the aircraft's wreckage was subjected to fuel specification test at DGCA Fuel & Oil laboratory. As per the received laboratory test report, there was no abnormality in the sample, and the fuel sample has passed the specification test.

Similarly, the Engine Oil sample collected from the aircraft wreckage was also subjected to specification test at DGCA Fuel & Oil laboratory. As per the received laboratory test report, there was no abnormality in the sample, and the fuel sample has passed the specification test.

### 1.16.2 Engine strip examination

To inspect and confirm the serviceability of the involved engine, same was subjected to the strip examination in a DGCA approved CAR 145 organization in the presence of investigation team. All accessories and components were disassembled progressively and thoroughly examined by authorized maintenance personnel as per applicable maintenance data.



**Figure 16: Images of engine components**

Some salient observations made during the engine examination are as given below:

- a) A visual inspection was carried out. During the visual inspection the engine's external condition was found satisfactory except few impact damages observed on some parts.
- b) All accessories were found intact at their respective mounting locations.
- c) Crankshaft's rotation was found normal.
- d) Camshaft was also found in good condition. Refer above figure 16 (4).
- e) All 4 pistons were checked and were found to be in good condition. Cylinder heads were also checked and were found to be in good condition. Refer above figure 16(2).

- f) All spark plugs were subjected to bench check and were found working satisfactorily (Refer above figure 16(6). The electrical harness was also subjected to bench check and was found working normal.
- g) Both Air filters were found intact at their respective locations on the engine and condition of the same was found good.
- h) Fuel pump condition was checked and except fuel pump mounting rest were found satisfactory. The Fuel pump mounting was found damaged due to impact.
- i) The exhaust pipe was found damaged due to impact.
- j) No metal particles were found except traces of carbon deposits on Magnetic plug. Refer above figure 16 (5).
- k) The gearbox and the bearing were also found in good condition. Refer above figure 16 (1).
- l) Oil pump was also found in good condition. Refer above figure 16(3).
- m) No traces of residual fuel were found in both Carburetors.
- n) No damage was observed on the Ignition system.

### **Conclusion of Strip Inspection**

Rotax 912 engine, fitted on Sinus 912 Motor Glider VT-GDI was Strip examined and was found in good condition along with its all accessories. No abnormality was found during inspection. Crankshaft, camshaft, pistons and all other moving parts were found intact and free for movement. No sign of engine stoppage due to malfunctioning of its component was found. The inference drawn after the strip examination was “There may be no fuel supply to the fuel system of the engine”

## **1.17 ORGANIZATIONAL AND MANAGEMENT INFORMATION**

### **1.17.1 M/s Jharkhand Flying Institute**

#### **a) General**

On 15<sup>th</sup> November 2000, consequent upon creation of Jharkhand state, the Bihar Flying Institute Ranchi (Gliding wing) was taken over by the **Govt. of Jharkhand, Civil Aviation Department (CAD)** and the organization’s name was changed to Jharkhand Flying Institute (Gliding wing). Organization informed the same to DGCA vide a letter no. JH/JFI/DGCA/770 dated 20.05.2001. Subsequently, a DGCA audit was carried out as per prevailing CAR Section 7 Series D Part II on 05<sup>th</sup> -06<sup>th</sup> September 2005. Post audit compliance, DGCA’s provisional approval of Gliding Instructor-In-Charge was granted on 08<sup>th</sup> June 2006 along with a condition that the organization has to comply with the requirement No.8 of Gliding Circular No. 1 of 1988 dated 05<sup>th</sup> May 1988 within Six months. Later, on 20<sup>th</sup> June 2006, Flying Training Organization approval to M/ Jharkhand Flying Institute (Gliding Wing) was granted by DGCA. The details of Flying Training Organization (FTO) approval’s validity given to M/s Jharkhand Flying Training Institute by DGCA are as tabulated below:

**Table 2: M/s JFI FTO approval validity.**

S. NO.	Date of approval intimation letter	Valid from	Valid Up to	Remarks
1.	20.06.2006	13.06.2006	12.12.2006	Six months
2.	17.01.2007	13.12.2006	12.06.2007	Six months
3.	09.09.2008	30 days		30 days
4.	05.12.2008	09.10.2008	08.09.2009	11 months
5.	16.11.2009	08.09.2009	31.01.2010	5 months
6.	10.12.2010	-----	31.12.2010	11 months
7.	12.01.2011	12.01.2011	11.02.2011	01 month
8.	25.02.2011	01.01.2011	31.12.2011	12 months
9.	14.02.2012	01.01.2012	31.12.2012	12 months
10.	19.02.2013	19.02.2013	18.02.2014	12 months

The FTO's approval validity given to M/s JFI's was always intermittent. The duration of FTO approval validity varies from 30days to 12 months. But last three approval validity duration was consistent with 12 months. As per records, after 18.02.2014, M/s JFI's FTO approval was expired and was never renewed till date of accident. **Hence, at the time of accident the organizations did not holds any FTO approval.**

#### **b) CAMO Approval**

At the time of accident, Organization was holding a DGCA's Subpart G Continuing Airworthiness Management Organization (CAMO) approval issued in the name of M/s Government of Jharkhand, CAD, Ranchi. The CAMO approval was issued on 17 April 2013 and was valid up to 31 July 2025. As per aircraft details given the organization's DGCA approved Continuing Airworthiness Management Exposition (CAME), the organization was having 03 Zlin 143L aircraft, one Stemme S6-RT and 03 Sinus 912 motor glider aircraft including VT-GDI. The Accountable Manager was the same person, who was holding the Accountable Manager post in M/s Jharkhand Flying Institute, Ranchi. The Continuing Airworthiness Manager (CAM) and Quality Manager (QM) were DGCA approved post holders.

#### **c) Aircraft Maintenance**

On the date of accident, M/s Government of Jharkhand, CAD was holding a maintenance contract with two DGCA approved MROs viz., M/s Aviators Co-Operative Society Limited, Patna and M/s Redbird Airways Pvt. Ltd, New Delhi for maintenance of its aircraft. M/s JFI's 03 Sinus 912 Motor Glider were maintained by M/s Redbird Airways Pvt. Ltd. The relevant extract from CAME is appended below:



### 3.1.3 Maintenance of Aircraft Operated or Managed


a). Govt. of Jharkhand, Civil Aviation Department currently operates the following aircrafts, whose details are given below;

S/N	Model & Type of aircraft	Regn No.	Contracted AMO
1.	Zlin 143L Airplane	VT-JHA VT-JHB VT-JHC	M/s Aviators Co-Operative Society Limited, Patna
2.	STEMME TSA-M S6-RT Motor Glider	VT-GSP	M/s Aviators Co-Operative Society Limited, Patna
3.	Sinus 912 Motor Glider	VT-GEE VT-GDI VT-GDA	M/s Redbird Airways Pvt. Ltd., New Delhi

**Figure 17: Extract from the CAME**

#### d) Type of Operation at M/s JFI

M/s Government of Jharkhand, Civil Aviation Department's DGCA approved CAME, Para 0.2.4, Type of Operation, States "M/s Government of Jharkhand, CAD provides Flying training operation by Motor Gliders and by Category 2 Light aircraft". The relevant extract of CAME is as appended below:

	Civil Aviation Department, Govt. Of Jharkhand	Document Reference No.: GOJ/CAD/CAR-M/01	
	CONTINUING AIRWORTHINESS MANAGEMENT EXPOSITION	ISSUE 04 REV 00	DATE NOV 2022

**0.2.4 Type of Operation**

Govt. of Jharkhand, Civil Aviation Department provides Flying training operation by Motor Gliders and by Category 2 Light aircraft.

In addition to our main base, the operation of aircraft/flying training may be conducted from other districts of Jharkhand as and when required and the required maintenance will be carried out in corresponding aerodrome as per the DGCA guideline.

**Figure 18: Extract from CAME**

The organization was conducting flying training operation (as mentioned in the CAME issue 04 Rev 00 dated Nov 2022) along with Joy rides. The investigation team thoroughly scrutinized the documents provided by DGCA and M/s JFI, regarding approval given for type of flying operation to be conducted by M/s JFI. Based on document scrutiny it was observed that, on the date accident M/s Government of Jharkhand, CAD was neither holding a FTO approval nor holding an air operator permit or any authorization or Permission granted by DGCA to undertake any commercial flying operation (Paid Joy Ride). **Hence, the organization was not holding any DGCA approval or approved documented procedure to undertake any commercial flying activities.**

**e) DGCA permission for operation**

DGCA CAR Section 3 Series 'C' Part X, Issue I, dated 2<sup>nd</sup> June 2010, mandates that the concerned state Government/PSU shall obtain permission from DGCA for operating such aircraft. **However, on the date of accident Organization was not holding any such permission from DGCA to operate aircraft.**

**f) Contracted Manpower**

On the date of accident, M/s Government of Jharkhand, CAD was holding a contract with M/s Aviators Co-operative Society Ltd (ACSL) for supply of manpower for operation such as pilots/instructors. Most of the pilots/instructors working in M/s JFI were under the manpower supply contract from M/s ACSL, except Director (Operations), who was an employee of Govt. of Jharkhand. The involved pilot was also from M/s Aviators Co-operative Society Ltd.

**1.17.2 Joy Ride**

a) M/s Jharkhand Flying Institute got FTO approval from DGCA on 20 June 2006. As per statement of Director (Operation), CAD, Govt. of Jharkhand, M/s JFI was carrying out joy ride flying at different flying bases in accordance with DGCA Gliding Circular no. such as 14 of 1981, 17 of 1981, 1 of 1988, and Flying Grant Circular No. 3/95. The purpose of DGCA circular No. 14 of 1981, on the subject 'Safety precautions- Joyride flight in glider' issued on 01 October 1981 was to prevent Joyride related incident. However, on the date of accident, the above mentioned DGCA circular was not available on the DGCA website and was also not applicable to M/s JFI. While discussing the flying activities being carried out by M/s JFI, Director (Ops)/ Accountable Manager stated that *"the main purpose of Glider Flying is to promote Aviation Activities in the State of Jharkhand"*. Director (ops) also stated that the organization has regularly informed DGCA about their flying activities such as joy rides and new flying bases via letters and emails. The organization did not receive any response from DGCA to stop glider flying or joy ride flying at its different flying bases. However, the Glider Flying Training Organization list published on the DGCA website, includes M/s JFI's name, is supportive evidence.

As per M/s JFI's records, the Glider flying training at Dhanbad airport base was started from 23rd February 2013 and the Joy ride flying in the aircraft VT-GDI was started in July 2017. On 20th July 2019, M/s JFI had issued a Standard Operating Procedure (SOP) for operation of Motor Glider/Glider Joy ride flying. Relevant portion of SOP is appended as below in Fig 19.

During the investigation, it was observed that some instructions given in M/s JFI's SOP were not followed on the day of accident during the Joy Ride sortie such as *"The Joy Rider and his both hands shall be strapped with the harness"* and *"Photography and mobile snapping shall be prohibited"*. **Further, some instructions mentioned in M/s JFI's SOP are in variance with DGCA Air Safety Circular No. 03 of 2009, for example instruction no. 2 & 3.**

## मोटर ग्लाइडर/ग्लाइडर Joy Ride हेतु सामान्य परिचालन अनुदेश (SOP)

मोटर ग्लाइडर/ग्लाइडर Joy Ride हेतु सामान्य परिचालन अनुदेश (SOP) का परिपालन सभी Glider Pilots के द्वारा किया जाना अनिवार्य होगा। इसकी एक प्रति विमान में हर समय उपलब्ध रहेगी तथा उड़ान के पूर्व सभी पायलट यह सुनिश्चित करेंगे कि नीचे दी गई कंडिक्शन का अनुपालन नियम पूर्वक संपादित किया जा रहा है :-

1. उड़ान के पूर्व Joy Rides को सुरक्षा, मापदण्ड का अनुदेश देना।
2. Cockpit में बैठने के उपरान्त Rudder से पांव की दूरी रखना।
3. Rudder Paddle Joy Ride के दौरान Extreme end position में रहेगा।
4. Joy Ride पूर्णतः Harness से Strapping करते हुए दोनों हाथ Harness के साथ रहेंगे।
5. Joy Ride के लिए Cushion का उपयोग नहीं किया जाएगा।
6. Photography एवं Mobile Snapping प्रतिबंधित रहेगा।
7. Continuously Joy Ride की स्थिति में Aircraft रनवे की ओर Park होगा ताकि Propeller Joy Ride की ओर facing ना हो।
8. Joy Ride के बैठने के समय महिला यात्री की साड़ी एवं ओड़नी पर विशेष ध्यान दिया जाना है ताकि Propeller Suck ना करे।
9. Joy Ride के साथ Head phone का इस्तेमाल नहीं किया जाएगा।
10. प्रत्येक 01:30 घण्टे उड़ान के उपरान्त at least 10:00 minutes का विराम अनिवार्य होगा तथा Engineer & Technician विमान की जांच करेंगे।

1. Pilots & Technician यह सुनिश्चित करेंगे कि Joy Ride comfortable हों तथा उनकी ओर का Door Properly Locked हो।
12. सभी Joy Ride यात्री उड़ान के समय सुरक्षा घेरे के बाहर रहेंगे।
13. Pilots & Technician बिये जा रहे Joy Ride के Numbers याद रखेंगे तथा उड़ान के पश्चात् indemnity Bond से मिलान करेंगे।
14. Joy Ride हेतु Maximum Height 1000 feet AGL तथा Lowest Height 800 feet AGL होगी।
15. Strong & Cross Wind के साथ 03 Km visibility कम होने पर उड़ान प्रतिबंधित रहेगा।
16. सभी उड़ान कार्य South Sector में सम्पादित होंगे।
17. उड़ान के दौरान Ground Communication/Ground ATC के अनुसार ही पायलट Landing सुनिश्चित करेंगे।
18. जीप सं.-9790 पूर्णतः Aircraft movement को watch करते हुए termmac पर तैनात रहेंगे।
19. Stand by communication के लिए 01-01 UHF विमान में तथा 01 UHF जीप में और 01 UHF विमान विमान अभियन्ता के पास रहेंगे।
20. उड़ान के दौरान जीप ड्राईवर एवं Ground ATC हमेशा एक साथ रहेंगे तथा यह सुनिश्चित करेंगे कि Takeoff एवं Landing के वक्त Runway Clearance बना रहे।

उपरोक्त सामान्य परिचालन अनुदेश (SOP) का परिपालन सभी Glider Pilots एवं Technical Maintenance Wing के लिए अनिवार्य है।

**Figure 19: M/s JFI's Joy Ride**

b) As per M/s JFI's Joy Ride policy, before operating a Joy Ride flying, Pilot-In-charge (PIC) shall ensure the compliance of all instructions given in the SOP and passenger is required to fill the Indemnity bond. In the Indemnity bond, there are three type of Joy ride slab with charges viz. Rs 800/- for 10 min, Rs 1000/- for 05 NM and Rs 2000/- for 10 NM. The joy ride charges are required to be paid via card payment or UPI payment. It is also mentioned that in case of minor the indemnity bond is required to be counter signed by either parents or legal guardian.

During the scrutiny Joy ride records, it was observed that the payment for the Joy Ride sortie which met with the accident was done after 20 minutes of the accident i.e., the accident took place at 17:20 hours and the payment was done at 17:40 hours. This indicates that the Joy ride sortie was initiated in hurry.

c) As per records, duplicate flight controls of VT-GDI were never deactivated or removed for passenger (Co-pilot) seat during Joy ride sorties. Similarly, on the day of accident during the Joy ride sortie, Joy rider was allowed to occupy co-pilot seat with active flight controls. Whereas, the DGCA Air Safety Circular No.3 of 2009 on the subject **"Deactivation of duplicate controls in the cockpit"** dated 26<sup>th</sup> February 2009 categorically state that .... **all operators of aircraft certified for single pilot operations and fitted with dual controls shall deactivate the controls on the co-pilot side whenever the co-pilot's side seat is occupied by a passenger...."**. Relevant extract of the circular is as appended below:



**Air Safety Circular No.3 of 2009**

**Subject: Deactivation of duplicate controls in the cockpit.**

Analysis of accidents to General Aviation airplane and helicopters certified for single pilot operation has revealed that passengers occupied the copilot's seat with duplicate controls installed. Pilot faced serious problems in handling emergencies in effective manner. Interferences with the controls by passengers in emergency situation may jeopardize safety of aircraft and its occupants.

Instruction has already been issued by DGCA wherein it is advised that all operators of aircraft certified for single pilot operations and fitted with dual controls shall deactivate the controls on the co-pilot side whenever the copilot's side seat is occupied by a passenger. It is also advised that a logbook entry to that effect should be made in the Airframe log book. It will be the responsibility of the owner to ensure that the dual controls are deactivated.

In spite of the instructions already exists it was observed in the investigation of number of accidents that the duplicate controls in cockpit were not deactivated and passengers were allowed to sit on copilot's seat.

It is therefore reiterated that the owner /operator shall deactivate the controls in the cockpit, before departure, at the Copilot's seat when passenger is allowed to sit in the cockpit. The same shall also be confirmed by Pilot in Command before take-off. This procedure for deactivation shall also be reflected in the Company's Operations manual.

The above is for strict compliance by all operators with immediate effect.

**Figure 20: DGCA Air Safety Circular No.3 of 2009**

**d) Requirements for commercial operation (Joy Ride).**

Sub-rule (2) of Rule 134A of the Aircraft Rules, 1937 stipulates that no air transport service, other than a scheduled air transport service, shall be operated by an Indian air transport undertaking unless it holds a Non-Scheduled Operator's Permit granted by the Central Government (Powers delegated to DG, DGCA). Further, based on the above rules, DGCA CAR section 3 series C Part III, rev dated 21<sup>st</sup> May 2021 on the subject "Minimum Requirements for Grant of Air Operator Permit to Operate Non-Scheduled Air Transport Services" stipulates requirement for the same. The relevant extract from the DGCA CAR 3 series C Part III is appended in figure 21.

<b>2. APPLICABILITY AND SCOPE</b>	
2.1	Non-scheduled passengers and/or cargo operations may be carried out by using:
(i)	Single or multi engine aero planes, seaplanes and helicopters duly certified/accepted by DGCA in accordance with the Type Certificate issued
Rev. 7, 21 <sup>st</sup> May 2021	
1	
CIVIL AVIATION REQUIREMENT SERIES 'C' PART III	
SECTION 3 AIR TRANSPORT 1 <sup>ST</sup> JUNE 2010	
by FAA/EASA or other authorities acceptable to DGCA, and under conditions, if any, as stipulated by DGCA.	
(ii) Gliders, Hot-air balloons, Airships, and Micro light aircraft for purpose of joy rides.	

**Figure 21: Extract from DGCA CAR**

#### **e) Time for completion of Joy Ride**

During the investigation, the records pertaining to the previous Joy ride sorties carried out by the same pilot were assessed. As per records, there were several occasions in past, when three or more than three consecutive joy ride sorties were carried out by the same pilot on the same aircraft (VT-GDI). Details of the same is as tabulated below:

**Table 4: Previous Joy Ride Sortie Details**

S. No.	Date	Number sorties	From-to (Time in hours)	Total time elapsed (Hours)
1.	28.12.2019	30	08:00-15:30	08:30
2.	05.01.2020	07	15:30-17:10	01:40
3.	12.01.2020	06	14:00-15:50	01:50
4.	16.01.2020	05	15:00- 16:15	01:15
5.	21.01.2020	04	11:50-12:45	00:55
6.	02.02.2020	07	13:35- 15:40	02:05
7.	21.10.2022	04	12:00- 12:55	00:55
8.	01.03.2023	03	16:00-16:50	00:50
9.	02.03.2023	05	14:05- 15-20	01:15
10.	14.03.2023	03	16:40-17:25	00:45

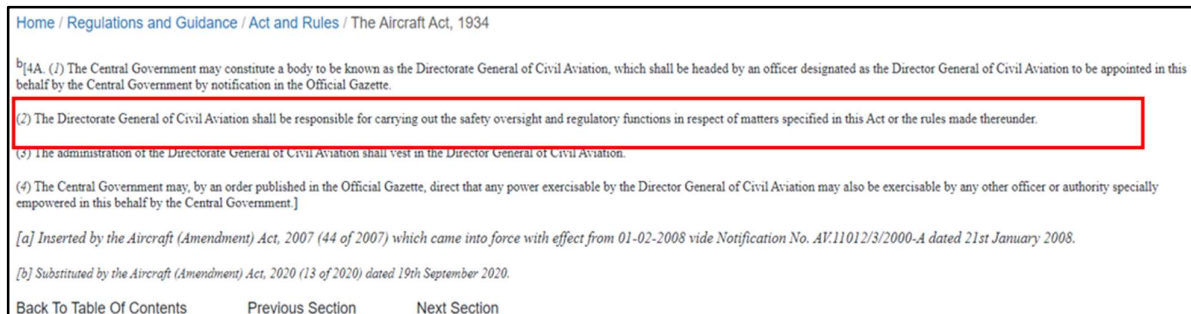
From the above table some relevant conclusions have been made:

- a) On 28 Dec 2019, 30 consecutive Joy ride sorties were carried out by the Pilot on the aircraft VT-GDI.
- b) The time elapsed for each joy ride sortie was 10 minutes.
- c) The interval between the two consecutive Joy ride sorties were varying from 05 to 10 minutes.
- d) The pilot was used to carrying out consecutive Joyride sorties.

**Based on above facts, the total time required to complete three Joy Ride sortie by the same Pilot requires minimum of 45 minutes (including 05 minutes pre-flight inspection, 03 Joy ride sorties of 10 minutes each and 02 interval of 05 minutes each) and if the interval between the two Joy ride can be taken as 10 minutes each then the Total time required will increased to 55 minutes.**

### 1.17.3 DGCA

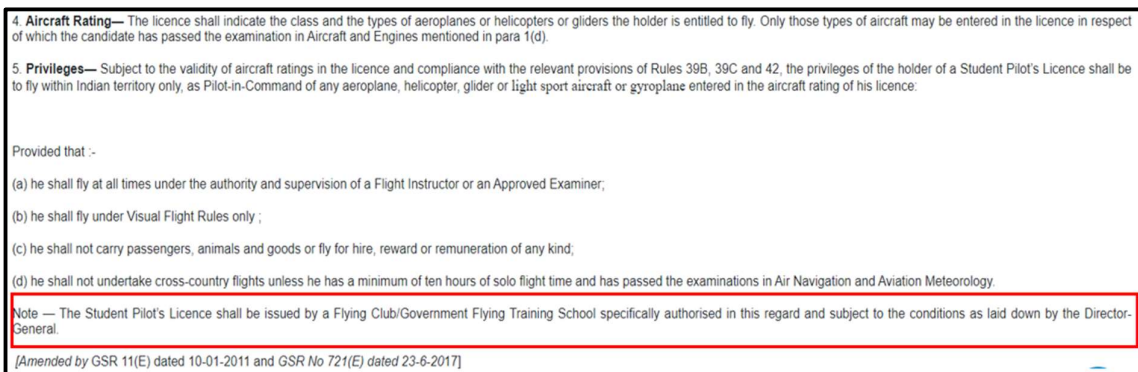
a) The Aircraft Acts, 1934, 4A (2), empowers DGCA to carryout out safety oversight and to perform regulatory functions, which states that ***“The Directorate General of Civil Aviation shall be responsible for carrying out the safety oversight and regulatory functions in respect of matters specified in this Act or the rules made thereunder”***. The relevant extract of same is attached herewith.



**Figure 22: Extract from the Aircraft Acts 1934**

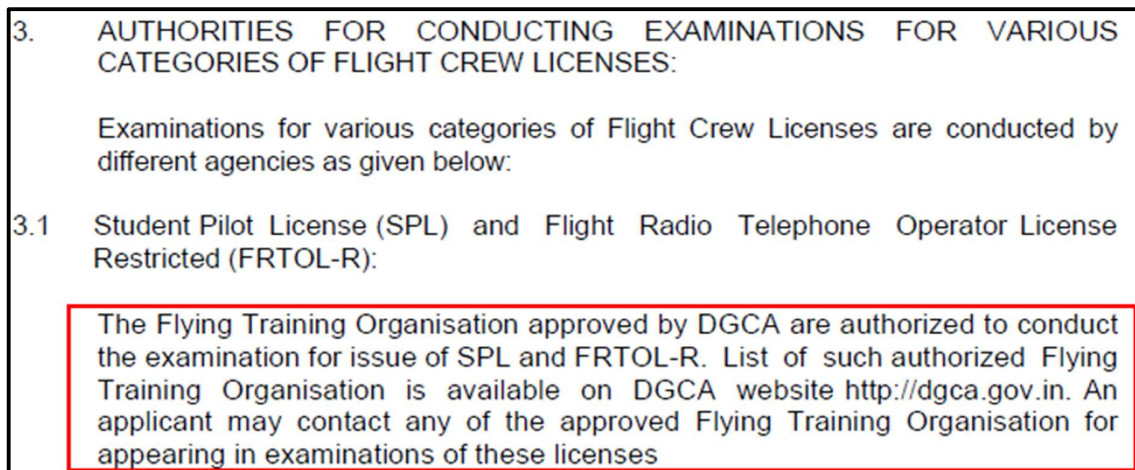
M/s JFI's Dhanbad base was never approved by DGCA for carrying out flying training activities or Joyride. Consequently, M/s JFI's Dhanbad base never came under the ambit of DGCA oversight/audit. Therefore, compliance with various DGCA CAR requirements, such as those related to operations and air safety, was on the discretion of the organization.

b) The Aircraft Rules 1937, Schedule II, Section B, States that ***“The Student Pilot's License shall be issued by a Flying Club/Government Flying Training School specifically authorized in this regard and subject to the conditions as laid down by the Director-General”***. The relevant extract from the same is as appended as figure 23.



**Figure 23: Extract from the Aircraft Acts 1934**

Further, DGCA CAR Section 7 Series 'B' Part I, issues III, dated 24th March 2017 also stipulates the requirements on the subject "Eligibility criteria for examinations for issue/extension of Flight crew licenses /ratings". In Para 3.1 of same CAR states that the Flying training Organization approved by DGCA are authorized to conduct the examination for issue of SPL and FRTOL-R. Extract from CAR is appended below:



**Figure 24: Extract from DGCA CAR**

During the investigation, it was observed that M/s JFI's FTO approval validity was expired on 18.02.2014, and **as per the Aircraft Rules, 1937 and DGCA CAR Section 7 Series 'B' Part I, M/s JFI authority to conduct SPL and FRTOL-R examinations ceased from the date of expiry.** However, M/s JFI had continued to conduct the SPL examinations and FRTOL-R. Moreover M/s JFI's had continued to send recommendations to DGCA for issuance PL (G) Licenses with FRTOL-R. Based on M/s JFI recommendations, DGCA had issued PL(G) licenses with FRTOL-R. In 2021, DGCA had stopped issuing PL (G) License with FRTOL-R on M/s JFI's recommendations. But DGCA has continued to issue PL (G) without FRTOL-R on M/s JFI's recommendations. In last 9 years i.e., time since the M/s JFI's FTO approval validity expired and till the date of accident, a total 23 licenses have been issued by the DGCA based on M/s JFI recommendations.



During the investigation, Director (Ops)/ Accountable of M/s JFI has stated that after completion of SPL examination, Organization used to send the copy of result to DGCA. But the organization did not receive any instruction on SPL examinations.

c) Para 3.1 of DGCA CAR Section 7 Series 'B' Part I, issues III, dated 24th March 2017, states that DGCA will publish a list of authorized Flying Training Organization on its website.

<b>List of Glider Training Organisation As on 31.03.2019</b>				
S.NO	NAME	STATE	FLEET DETAILS	NAME OF GIA/ GEA
1.	Gliding Centre Pune (Under control of DGCA)	Pune, Maharashtra	No. of WL- 02 1. Super Blanik L-23, VT-GLG 2. Super Blanik L-23, VT-GLL	Capt. Anupinder Singh Chahal- GEA
2.	Jharkhand Flying Institute (Gliding Wing) Ranchi	Ranchi, Jharkhand	No. of WL:-01 1. Super Blanik L-23, VT-GLE.  No. of MG :- 03 1. Sinus 912, VT-GDI, 2. Sinus 912, VT- GEE, 3. Stemme S6-RT, VT- GSP.	Capt. S.P Sinha- GEA
3.	Gliding and Soaring Centre(IIT), Kanpur	Kanpur, U.P.	No. of MG :- 02 1. Sinus 912, VT-GII 2. Sinus 912, VT- GDG	Capt. Ramesh Chandra Ramnani- GIA
* MG- Motor Glider, WL- Winch Launch				
* GIA- Glider Instructor Authorization, GEA- Glider Examiner Authorization				

**Figure 25: List available on the DGCA website**

During the investigation, it was observed that the list of Glider Training Organization published on the DGCA website includes the name of M/s JFI. But DGCA never issued any approval to M/s JFI post expiry of FTO approval in 2014.

d) DGCA CAR Section 5 Series 'F' Part III, issues III, 4<sup>th</sup> August 2015, mandates the requirements on the subject **"Procedure for medical examination of aircraft personnel for alcohol consumption"**. As mentioned in Para 3.3, "Applicability", the State Government Civil Aviation Departments are very much in the ambit of this regulation. However, during the investigation it was found that M/s JFI did not have B.A test facility at Dhanbad airport to conduct preflight B. A test of the pilots as required in the same CAR. This non-compliance of



the regulatory requirement could not be captured as the Dhanbad base was never inspected by DGCA.

**e) Surveillance Inspection of Jharkhand Flying Institute (Gliding Wing), Ranchi**

The surveillance inspection of Jharkhand Flying Institute (Gliding Wing), Ranchi main base was carried out by DGCA in the month of June 2014. During the oversight some non-compliances/findings were raised by the DGCA. Most of the findings were related to the lack of training facilities. But two of the findings raised during DGCA audit in 2014 are still relevant to this investigation and the same are as mentioned below:

- i. Flying Training Institute using Deoghar airfield for imparting training without DGCA approval.
- ii. No approved training manual.

On the date of accident, M/s JFI was found operating at Dhanbad airport without holding DGCA approval. During the investigation, M/s JFI's Director (Ops) stated that they had informed the DGCA via a letter about the Glider Flying at Dhanbad airport. Since no reply came from the DGCA and their organization's name is published on the DGCA website in the list of Glider Training Organization. Therefore, M/s JFI understood that DGCA is aware of Glider Training Flying at Dhanbad airport and they have no objections.

f) On the date of the accident, DGCA did not have any specific regulation/CAR to deal with granting of approval of Glider Training Organization. But the DGCA have some regulation pertaining to Glider Flying training such as regulation for Glider Instructors and Examiner. But due to unavailability of CAR/regulation regarding Glider Training Organization, M/s JFI FTO approval wasn't renewed. Hence, CAR and safety related non-compliances remained uncaptured.

g) During the investigation, DGCA's records pertaining to M/s JFI were examined. As per DGCA records, M/s JFI had made a CPL training institute approval request vide a letter ref No. CAD/ops/nodal/353 dated 12.12.2011. However, till the date of accident no such approval was available with the Organization.

**1.17.4 History of last M/s JFI's Glider accident.**

As per records, on **03<sup>rd</sup> Feb 2020, L23 Super Blanik Glider VT-GLE** owned by DGCA, operated by M/s Jharkhand Flying Institute, while undertaking **joyride flight met with an accident at Dumka airstrip, Jharkhand at 1150 UTC**. The accident was investigated by AAIB and report of the said accident was published on the AAIB's website.

As per investigation report, the probable cause of accident was "The pilot executed final turn with insufficient speed and excessive application of rudder which caused the glider to stall, coupled with insufficient height to allow recovery". 04 recommendation was also made in the said investigation report.

**Two relevant and common issues observed in both accidents are as given below:**

- a) The aircraft operation type was Joy ride.

b) Before operating the joyride flight, flight controls of passenger was not removed as per the existing DGCA Air Safety Circular 03 of 2009.

### 1.18 Additional Information

#### 1.18.1 Joy Ride sortie video

During the joy ride sortie, the passenger had captured of joy ride sortie in a mobile phone carried onboard. The relevant snapshots of the video are appended below:



**Figure 26: Joy ride Video crucial events snapshots**

#### **Above shown Snapshot description (as per numbering):**

1. Engine Startup at (00:00:00 sec)
2. Take-off roll started at (00:00:12 sec)
3. Instrument panel display unit turned ON at (00:00:15 sec)
4. Low fuel pressure warning triggered on display unit at (00:00:28)
5. Engine stopped in air at (00:00:42)
6. Propeller rotated and stopped on cranking (00:00:45 sec)
7. Aircraft fly over the airport boundary (00:01:04 sec)
8. Just before crash (00:01:20 sec)

The crucial moments of the joy ride sortie were captured in the passenger's mobile phone, starting from engine start-up till crash landing. As per video footage, the take-off roll initiated at 12 seconds of engine start. The instrument display became alive at 15 seconds of the engine start-up and the aircraft airborne at 00:27 seconds from the engine start-up. At 00:28 seconds from the engine start up, a Low fuel pressure alarm was triggered on the display unit and was got captured in the video footage. Engine stopped at 42 seconds and the Pilot cranked the engine only once at 45 seconds.

### 1.18.2 Authorization of Glider Instructors and Glider Examiners

DGCA's Civil Aviation Requirements Section 7, Series I, Part XI, dated July 13, 2017, was issued to standardize glider training activities and to lay down the minimum requirements for the issuance of authorization for Glider Instructors and Glider Examiners on Gliders/Motor gliders. The minimum requirements and authorization privileges are as tabulated below:

**Table 1: DGCA Glider Instructor and Examiner**

Glider Instructor			
Experience	Minimum Requirement	Validity	Privileges
Hours (PIC)	50Hrs	05 Years	(a) To impart flying instructions on all gliders entered in the aircraft rating of his Pilot’s License (Gliders), (b) To impart instructions for carrying out aero-tow provided he holds an Aerotow rating. (c) To impart instructions on motor gliders provided he holds a motor-glider rating. (d) To supervise and authorize solo flights by Student Glider Pilots. (e) To conduct skill tests for issues and renewal of PL(G) and extension of aircraft rating on PL(G) provided he has more than 50 hours of instructional experience on gliders and not less than 10 hours of flight time as PIC on gliders within preceding 12 months.
Launches (PIC)	250		
PIC flights (> 2 hours)	2		
PIC cross-country (> 30NM)	1		
Instructional hours	N/A		
Glider Examiner			
Experience	Minimum Requirement	Validity	Privileges
Hours (PIC)	250Hrs	05 Years	(a) All privileges of Glider Instructor (b) Conduct glider instructor courses for issue of Glider Instructor Authorization (c) Conduct refresher courses for Gliding Instructors (d) Carry out Competency Check for issue/renewal of Glider Instructor Authorization and Glider Examiner Authorization
Instructional hours	200 Hrs.		

			(e) To conduct oral examination for issue/renewal of Glider Instructor authorizations.
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In the aforementioned CAR Para 5, reasons and circumstances for withdrawal of Instructor/examiner privileges has also given. The same are as quoted below:

*“The DGCA may withdraw Glider Instructor/Glider Examiner authorization if evidence shows that an Instructor/Examiner:*

- *At any time, acts in a manner which is in contravention of the guidelines contained in this CAR;*
- *Failed to follow the applicable instructions to maintain the required standards, or to follow proper procedures;*
- *Fraudulently misused Instructor/Examiner authority, or acted in any other way that would discredit the DGCA;*
- *Breached the DGCA Civil Aviation Rules and Regulations; or*
- *During the course of a Skill Test, Competency Check, or Standardization Check failed to meet the required DGCA Standards.*

*In the Appendix of the above-mentioned CAR, Course outline and duration is deliberated. Wherein it is sub divided in two Structured Classroom Training and Practical Training Exercises.”*

In the above CAR, there is no regulation/guidelines outlined about the safety standards required to be followed by a Glider training organization or where these examiner/instructors can impart Glider training. Further, how DGCA will ensure safety oversight of such Glider training organization or where these examiner/instructors can impart Glider training is also not outlined.

### **1.18.3 Technical logbook**

During the investigation it is observed that the technical logbook was not filled properly as per the requirement laid down in CAR-M sub-part C, MA 305 & 306 i.e., some entries such as fuel & oil records etc., were not filled for each sortie. Similarly, the pre-flight inspection carried out by the PIC could not be ascertained or confirmed as the entries pertaining to the same was not filled in technical logbook.

### **1.19 Useful or Effective Investigation Techniques**

To simulate the situation on similar type of aircraft on ground to understand the engine responses with both fuel valves in closed position. The outcome of the simulation was crucial corroborative evidence to confirm the reason of engine failure in mid-air. Therefore, ground

simulation of inflight aircraft engine failure can be considered as an effective Investigation Technique for this investigation.

## **2. ANALYSIS**

### **2.1 Serviceability of the Aircraft**

During the investigation, aircraft's maintenance records have been assessed and scrutinized to determine the serviceability of the aircraft. Aircraft's mandatory certificates/documents issued by DGCA were also checked. Based on the scrutiny of aircraft's records, engine examination report and Ground Simulation, the following conclusions have been made:

- a) At the time of the accident, aircraft's C of R, C of A, ARC and Aero Mobile License were current and valid as per the requirement laid down in the relevant DGCA CAR. The aircraft's weight schedule approved by DGCA was valid.
- b) **The load and trim sheet for the Joy ride sortie was not prepared.** During the investigation to verify the aircraft C.G. position for the accident sortie, the load and trim calculation was carried out and **the C.G of the aircraft was found within the OEM's prescribed limits.**
- c) As per aircraft maintenance records, 100 hours/annual inspection was the last scheduled inspection carried out on the aircraft and engine at Dumka on 27 February 2023. During the above inspection, fuel system related checks were also carried out and no abnormalities were found. After satisfactory completion of the inspection CRS was issued by a licensed AME.
- d) The aircraft and engine had logged 07:04 hours, since the last scheduled inspection carried out.
- e) As per aircraft's maintenance records as on the date of accident, all concerned AD, SB, mandatory SB, and DGCA Mandatory Modifications on this aircraft and its engines were found complied. No snag was pending for rectification.
- f) Just 10 minutes before the Joy ride sortie, the same Pilot had completed a 20-minute flying training sortie. Post completion of the training sortie, no snag was reported by the Pilot.
- g) To verify the serviceability of the aircraft's engine, the involved engine was thoroughly examined in a DGCA approved 145 organization. No abnormality was found during the inspection. No sign of engine stopped due to malfunctioning of its component was found. The inference drawn during the engine examination was **"There may be no fuel supply to the engine"**.
- h) During the investigation wreckage was examined to identify any pre-crash impact leakage or blockage in fuel system and nothing abnormal was found.
- i) During the investigation, another Sinus 912 motor glider fitted with Rotax 912 engine was operated on ground with both fuel valves in closed position. The response of engine and warnings triggered on the display unit were like the engine responses and warnings triggered during the accident sortie. **Therefore, it is evident that during the joy ride sortie, both fuel valves were in closed position as found during the wreckage**

examination. Consequently, engine stopped soon after take-off due to fuel starvation.

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

## **2.2 Weather**

The pilot had obtained the weather information before the first sortie of the day. The weather or meteorological information obtained by the pilot was corroborated with the other sources and it was confirmed that the weather condition at the time of accident was above minimum to undertaking the Joy ride sortie. Hence, **the weather was not a contributory factor to this accident.**

## **2.3 Crew Aspects.**

### **2.3.1 Crew Qualification**

The Pilot was holding a valid PL (G) license issued by DGCA. The pilot was also holding a valid Glider Instructor and Examiner authorization issued by DGCA. Total flying experience of the Pilot accumulated till the date of accident was 602:08 hours. The joy ride sortie was authorized by the same pilot. Further, in past the same Pilot had operated a good number of Joy Ride sorties on the same aircraft. **Therefore, it is concluded that the crew was appropriately licensed and experienced to undertake the flying sortie and Crew Qualification was not a contributory factor to this accident.**

### **2.3.2 Crew actions and handling of the Aircraft**

- i. Before operating the joy ride sortie, on that day the Pilot had operated three uneventful training sorties on the same aircraft.
- ii. As the pilot was in a hurry to complete three Joy Ride sorties within the remaining daylight i.e., before sunset. Therefore, the Pilot initiated the Joy ride sortie without even waiting for completion of payment.
- iii. The Pilot was not subject to pre-flight Breath Analyzer (B.A) Test as required by DGCA CAR Section 5 Series F Part III. The Pilot had only signed the B.A test register. **This was a non-adherence of DGCA CAR Section 5 Series F Part III.**
- iv. Before operating joy ride sortie, the Pre-flight inspection was not carried out as per the procedures mentioned in OEM's flight manual. Only a brief pre-flight inspection based on memory was carried out by the Pilot. Whereas OEM's flight manual highlights the importance by mentioning a warning as quoted below:  
***"WARNING! Every single check-up mentioned in this chapter must be performed prior to EVERY FLIGHT, regardless of when the previous flight took place!"***  
**This was a non-adherence to the operational requirements laid down by the manufacturer for the safe conduct of flights.**
- v. For the joy ride sortie, Load and trim sheet was not prepared, whereas as per requirement laid down in the Para 9.4 of DGCA CAR Section 2 series 'X' Part II, Load and trim sheet for each sortie is mandatory and Pilot-in-Command is responsible for

preparing the same. **This was a non-adherence to the prevailing DGCA CAR Section 2 Series X Part II.**

- vi. For the Joy ride sortie, passenger was allowed to occupy co-pilot seat with active flight controls, whereas DGCA Air Safety Circular No.3 of 2009 requires deactivation of duplicate controls when a passenger is allowed to occupy co-pilot seat. It further states "The same shall also be confirmed by Pilot-in-Command before take-off". **This was a non-adherence to DGCA's Air Safety Circular 03 of 2009.**
- vii. As the pilot was in a hurry to complete three Joy Ride sorties within the remaining daylight. The Pilot attention was on the completion of three joyride sorties. Hence, the Pilot switched on the engine and immediately initiated the take-off roll without even waiting for few minutes to stabilize the essential engine parameters as recommended by the OEM in its engine start-up procedures. Hence, the pilot did not follow the engine start up procedure. **This was also a non-adherence to the operational requirements laid down by the manufacturer for the safe conduct of flights.**
- viii. As per the Normal flying procedure given in the aircraft's Pilot Operating Handbook (POH), during the Take-off and initial climb the pilot is required to check the position of Fuel valves. The Pilot did not check the same. **This was also a non-adherence to the procedure laid down by OEM in the POH for the safe operation of flights.**

ix. **Human Factor Aspect:**

Human performance is always dependent upon the various factors such as environmental condition, organizational culture, psychological condition etc. A systematic approach can only be the solution to the human variability and can only ensure the Safety culture in an organization. Consequently, will prevent the reoccurring of similar occurrence due to human error. It is a proven fact that the emotion or stress can jeopardize the decision-making relevance and cognitive functioning. During the investigation following two human factor aspect was found involved:

- a. At 17:10 hours IST, the aircraft landed back after completion of third training sortie. The Pilot shutdown the engine. While walking towards the hanger Pilot instructed the ground staff to park the aircraft inside the hanger. When Pilot entered the hanger, flight clerk informed the Pilot about the three Joyride sortie request which just came in. Initially, Pilot turn down the request as 35-40 minutes were remaining before the sunset, as the minimum total time required to complete three consecutive joy ride sorties will be 45-55 minutes and each joy ride sortie will be of 10 minutes. As the Pilot was base in charge for M/s JFI at Dhanbad airport base, hence the Pilot was also responsible to promote the organization's policy for creating Glider flying awareness in the state. In addition, in the past on several occasions, the pilot had operated a good no. of Joy ride sorties. Therefore, when Joy ride passengers insisted for Joy ride sortie, Pilot did not refuse and accepted the three Joy ride request. **The above discussion indicates the two human factor aspects, complacency and organizational influence. When the time remaining to sunset was less**

**than the time required to complete three Joy ride sorties, instead of rejecting the request outright, the pilot accepted the same due to complacency and under the Organizational influence.**

- b. The Pilot was owning a pet shelter home for rescued pets. Same day morning, one of its pets died. Hence, after completion of two forenoon training sorties, the Pilot went to the pet shelter home to bury the pet's body. While returning, as the hanger was on the way to his home, Pilot's family came along with the Pilot. So that after completion of one remaining training sorties in the evening they all will go together to home. The Pilot was emotionally upset due to Pet's death. As per (reference: FAA, PHAK Chapter 2-Aeronautical Decision - making), psychology stress is defined as *"Social or emotional factors, such as a death in the family, a divorce, a sick child, or a demotion at work. This type of stress may also be related to mental workload, such as analyzing a problem, navigating an aircraft, or making decisions"*. The emotional condition or psychological stress affects the decision making in critical situation. In other words, Human factors in aviation related several studies concluded that the emotional condition or psychological stress affect the pilot's decision making in a critical situation and identifies this as a risk. This kind of risk required to be identified and mitigation action should be taken by the pilot. In this case, when the engine stopped soon after the aircraft took-off, the pilot tried once to restart the engine. But didn't follow the entire emergency procedure required to restart an engine failed in air. The Pilot didn't even think of checking the position of the fuel valve located inside the cockpit as pre-OEM's prescribed engine restart procedures. The Pilot instead of taking a right decision of restarting the engine by properly following the startup procedures, choose to force land the aircraft. Otherwise, the Pilot would have identified the closed fuel valves, and the engine would have reignited with 12-15 seconds. This indicates that the pilot was not able to handle the prevailing emergency as required and lost the situational control.

**After analysis of the available facts and careful examination of all the evidences it can be concluded that the human factors are very much associated to this accident, which includes Organizational influences, prevailing Cognitive Factors (inattention) and Psycho Behavioral Factors (Emotional State).**

**Based on all above factors it is concluded that crew actions and handling of the aircraft was one of the major contributory factors to this accident.**



## **2.4 Organizational Aspects**

### **2.4.1 DGCA**

#### **2.4.1.1 Authority to conduct SPL & FRTOL-R**

DGCA CAR Section 7 Series 'B' Part I, issues III, 24th March 2017 states that the Flying Training Organization approved by DGCA are authorized to conduct the examination for issue of SPL and FRTOL-R.

As per DGCA records, M/s JFI holds the FTO approval from June 2006 to February 2014. However, the FTO approval validity varies between 30 days to 12 months. M/s JFI FTO approval was expired on 18.02.2014. Thereafter, M/s JFI's FTO approval was not renewed or extended by DGCA due to unavailability of CAR/regulation regarding Glider Training Organization.

However, M/s JFI had continued to conduct the SPL examinations and FRTOL-R. Moreover M/s JFI's had continued to send recommendations to DGCA for issuance PL (G) Licenses with FRTOL-R. Based on M/s JFI recommendations, DGCA had issued PL(G) licenses. **This is a non-adherence to the Aircraft Rules 1937, Schedule II, Section B and DGCA CAR Section 7 Series 'B' Part I.**

Further as per the requirement given in Para 3.1 of DGCA CAR Section 7 Series 'B' Part I, issues III, 24th March 2017, DGCA had published a list of Glider Training Organization in 2019 on its website. That list includes the name of M/s JFI. **This is a non-adherence to the DGCA CAR Section 7 Series 'B' Part I.**

#### **2.4.1.2 Safety Oversight**

DGCA had continued to issue PL(G) license on recommendations given by M/s JFI even after expiry of FTO approval in 2014. Moreover, the list of Glider Training Organization published on the DGCA website in 2019 contains the name of M/s JFI.

Surveillance/audit/spot checks are being carried out by DGCA to ensure the compliances of regulatory requirement, which is the primary task of a regulatory authority as per Para 4(A) of the Aircraft Acts, 1934.

However, the DGCA never carried out any safety oversight of M/s JFI Dhanbad airport base, where flying training exercise and joy ride (commercial flying) sorties were being carried out.

#### **2.4.1.3 DGCA Regulation on Glider Flying**

DGCA have certain regulation pertaining to Glider training in various CAR such as Section 7, Series I, Part XI regarding Glider Instructor and Examiner. But DGCA did not have any specific regulation/CAR to deal with approval of Glider Training Organization. Therefore, there is a requirement to formulate specific regulations in the form of DGCA CAR, etc. pertaining to Glider flying training organization approval.

**In view of above discussion, it is concluded that lack of regulatory oversight and regulatory control on the Glider training Organization were also a contributory factor to this accident.**

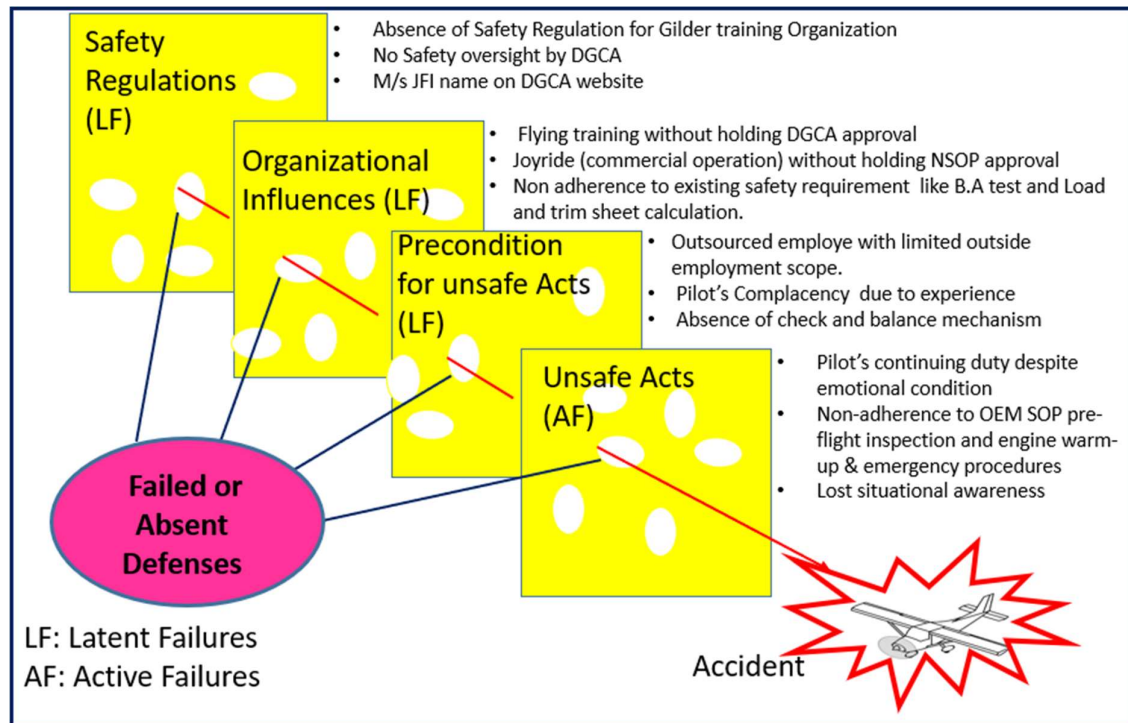
#### 2.4.2 M/s Jharkhand Flying Institute

- a) As on the date of accident, M/s JFI was not holding any DGCA Flying Training Organization approval. However, M/s JFI was involved in conducting flying training activities at Dhanbad airport since 23 Feb 2013. Further, in 2014 DGCA audit, DGCA had raised a similar type of audit finding viz M/s JFI was using Deogarh airfield to impart training without DGCA approval. **Hence, it is evident that the practice of non-compliance of DGCA CAR is still existing in the Organization.**
- b) M/s JFI was conducting Joy ride sorties from its various bases. The Director (Operations) of M/s JFI submitted that the information about conduct of flying training activities and the joy ride at various bases was sent to DGCA through letters, but they did not receive any response from DGCA in this regard. However, it is clear that the organization was neither holding a DGCA NSOP's permit as per DGCA CAR Section 3 Series 'C' Part III nor holding an operation permission as required in DGCA CAR Section 3 Series 'C' Part X. **Therefore, the joy ride flying being carried out by M/s JFI at its different flying bases are in non-adherences to the DGCA CAR Section 3 Series 'C' Part III and DGCA CAR Section 3 Series 'C' Part X.**
- c) M/s JFI was not having B.A test facility to conduct preflight B.A test as required by the DGCA CAR Section 5 series F part III. **Therefore, M/s JFI was in non-adherence to the DGCA CAR Section 5 Series F Part III.** Further post-accident, the Pilot was not subjected medical examination to check whether the pilot was under the influence of alcohol or psychoactive substance. **This was also a non-adherence to DGCA CAR Section 5 Series F Part III.**
- d) During the Joy ride sorties, the passengers were allowed to occupy the co-pilot sit without deactivating the duplicate controls i.e., with active controls. As per the DGCA Ais Safety Circular no. 3 of 2009, this could jeopardize the safety of the aircraft and its occupants. **This was a Non-adherence to the DGCA Ais Safety Circular no. 3 of 2009.**
- e) At M/s JFI Dhanbad airport base, load and trim sheet were not being prepared for the flying training as well as joy ride sorties. Flying an aircraft without determining /calculating its CG values is an unsafe practice. **This was a Non-adherence to the DGCA CAR Section 2 Series 'X' Part II.**

**In view of above, it is concluded that the flying training and joy ride sorties at M/s JFI's Dhanbad base were in non-adherence to various prevailing DGCA CAR regulations. Therefore, organization's unsafe practices were one of the contributory factors to this accident.**

## 2.5 Circumstances Leading to the Accident

Circumstances which led to this accident could be explained with the help of a well-known Reason's Swiss cheese model of accident causation. A self-explanatory diagram of the model is depicted below:



**Figure 27: Reason's Swiss cheese model**

As depicted in the above accident causation model, accidents require the aligning of several enabling factors, each one is significant but not sufficient to breach system defenses. In any safety system, there are several layers of defenses or safety barriers that prevents an accident like a cheese slice. However, when failures (loopholes) of each safety barriers aligned then only an accident took places.

**The safety failures are of two types viz. Latent and Active.** A Latent failure is a systematic failure or failure resulted due to unsafe settled practices, whereas an active failure is directly associated with a doer or human or performer. The latent failures can be minimized to a great extent by enhancing safety culture and by adopting best practices in an organization. Whereas an active failure can be minimized to a lesser extent in comparison to the latent failure. Since a human performance can be directly influenced by various factors such as situational, environmental, organizational pressure or workload.

In this case, Safety barriers or defenses are Safety Regulation, Organizational influences /culture, Precondition for unsafe acts and unsafe acts.

## 1. Safety Regulation

- i. On the date of accident, M/s JFI's Flying Training Organization approval was invalid, **hence there was no Safety oversight by DGCA to ensure the compliances of mandatory regulations to ensure safe operational activities.**
- ii. Although M/s Jharkhand Flying Institute was not holding any FTO approval, but DGCA's website depicts M/s JFI as Glider training Institute. This resulted in a lack of clarity regarding the approval given for Glider flying training operations. Accordingly, M/s JFI continued its flying activities even after its FTO approval expired, and no separate approval was given to them for glider training or joy rides. This also led to uncontrolled and unsafe flying activities.

**In view of above it is concluded that the very first layer of safety barrier was absent or breached.**

## 2. Organizational Influences/ Culture

- a. M/s JFI's Dhanbad airport base was never approved by DGCA, to undertake flying training activities in accordance with DGCA regulation pertaining to flying training Organization. However, M/s JFI continued its flying training activities without complying the safety regulation. **This exhibits presence of an unhealthy safety culture in the organization.**
- b. M/s JFI was neither holding a NSOP approval nor having any operation permission to conduct a joyride sortie with passenger. But M/s was used to conduct Joy ride sorties at its different bases. **This is a non-adherence to the prevailing DGCA regulation. This also exhibits disregard to DGCA CARs and presence of an unhealthy safety culture in the organization.**
- c. At Dhanbad airport, the Pilot B.A test was not carried due to unavailability of B.A test facility and B.A registered was signed. **This also exhibits disregard to DGCA CARs and presence of an unhealthy safety culture in the organization.**
- d. The load and trim sheet were being not prepared for the flying sorties at Dhanbad airport. **This also exhibits disregard to DGCA CARs and presence of an unhealthy safety culture in the organization.**

**The above-mentioned factors confirm the existences of unhealthy safety Culture in the organization and the second layer of safety barrier was breached.**

## 3. Precondition for unsafe acts

- A. M/s JFI was managed and governed by the CAD, Government of Jharkhand. But most of the pilots/instructors working in M/s JFI Dhanbad airport base, were outsourced employees of M/s ACSL, working under the manpower supply contract signed between M/s Govt. of Jharkhand and M/s ACSL. The pilot was base-in-charge for Dhanbad airport and was fully aware of the fact that the B.A test facility was not available. Since, the pilot was an outsourced employee, did not have much role in Organization Management. In addition to that the personnel working in M/s JFI were aware about limited employment scope or limited opportunity for Glider flying Pilots

in the aviation industry. Therefore, the pilot did not raise any concern about the lack of safety procedures (such as unavailability of B.A test facility and allowing the passenger to occupy co-Pilot seat with active controls, etc.) exiting in organization and kept his focus on flying the machine as much as possible.

- B. As the Pilot was the base-in-charge and was also a DGCA approved Glider Instructor and examiner. In addition to above, in the past on several occasions since 2019, the Pilot was used to carry out consecutive Joy ride sorties, at Dhanbad airport. Hence, complacency came in the Pilot's behavior.
- C. M/s JFI Dhanbad base was never subjected to DGCA oversight to check Glider flying operation. Since, there was no check and balance, hence, the organization's safety culture got marginalized and it became a habit for the people working in that environment to ignore safety requirements.

**In view of above discussion, it is concluded that precondition for unsafe acts was already existing, hence this defense system or safety barrier was also ineffective.**

#### **4. Unsafe acts**

- I. On the day of accident, due to pet's death, Pilot's decision taking ability was affected due to the Pilot's emotional condition. **The pilot should have opted for day rest, but the pilot did not able to identify the risk associated and continued the flying activity.**
- II. As per aircraft flight manual, the Pre-flight inspection is one of the mandatory checks, before initiating any flight and required to be performed meticulously. **But the Pilot did not perform the Pre-flight inspection as per OEM requirement.**
- III. Although the remaining day light was insufficient to complete three joy ride sorties but under the organizational influence, **the pilot did not reject the three Joy ride sortie request and initiated the joy ride in a hurry. The Pilot was in hurry, could be also corroborated by the fact that the without completion of payment, the Joy Ride sortie was convened.**
- IV. During the Joy ride sortie, the Pilot switch ON the engine and **immediately initiated the take-off roll without even waiting to stabilize the essential engine parameters.**
- V. When the engine stopped just after take-off, the pilot tried once to restart the engine. But didn't follow entire emergency checklist for in air engine failure. The Pilot didn't even think of checking the position of the fuel valves located inside the cockpit as pre-OEM's prescribed engine restart procedures. **As the Pilot's decision taking ability was affected by the emotional condition, Pilot lost the situational awareness.**

#### **Summary:**

Initially, as the time remaining before sunset was less than time required to complete three joy ride sorties, therefore, the joy ride request was turned down. But on repetitive request, the Pilot complacency clubbed with the responsibility of base in charge to adhere with the M/s JFI's policy to promote Glider Flying in the state, the Joy ride sortie was convened in a hurry. **Consequently, the Joy ride sortie was initiated without even completing the payment for the Joy ride, the pre-flight inspection was not carried out as per OEM's requirement and the fuel valves were left in closed position.** In addition to above, several non- adhere to

essential OEM operational safety requirement and the take-off roll was initiated immediately after Switching ON the aircraft's engine. **Consequently, the aircraft's engine stopped after few second of take-off due to fuel starvation.** After the engine stopped in flight, the engine restart was attempted without adhering to the OEM's laid down emergency procedures. Hence, the engine did not restart. Emergency was dealt improperly due to lack of situational awareness and erroneous decision to forced land the aircraft was taken. Subsequently, no further action was taken, that underlines the effect of emotional condition on decision making ability. Subsequently, the aircraft crashed in a residential area.

### **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. No snag was pending on the aircraft and its engine for rectification.
3. Load and Trim sheet were not prepared for the Joy Ride Sortie. During the investigation Load and Trim calculation was carried out and C.G for the Joy Ride sortie was found within the limits.
4. The wreckage was examined and no evidence of fuel leakage or blockage in fuel system was found.
5. Both fuel valves located inside the cockpit were found in closed position.
6. During engine strip examination, nil abnormality was found and inference drawn during the examination was "There was no fuel supply to the engine".
7. Operation of another Sinus 912 motor Glider aircraft fitted with Rotax 912 engine with both fuel valves in closed position, yields the similar responses and warning like accident sorties.
8. The weather was not a contributory factor to this accident.
9. The Pilot was holding a valid PL (G) license issued by DGCA. Total flying experience of was 602:08 hours.
10. The pre-flight Breath Analyzer (B.A) Test was not carried out due to unavailability of B.A test facility at Dhanbad airport is a non-adherence to the DGCA CAR Section 5 Series F Part III.
11. The Pre-flight inspection was not carried out as per the procedures mentioned in OEM's flight manual.
12. The Joy rider was allowed to occupy co-pilot seat with active duplicate flight control.
13. The Joy Ride sortie was initiated in hurry.
14. Non-adherence to several OEM's documented safety procedures such as engine start up.
15. Non-adherence to several applicable DGCA CARs such as DGCA CAR Section 3 Series 'C' Part III.
16. Human factors involved are complacency, emotional condition and organizational influences.

17. M/s JFI continued to conduct of SPL and FRTOL-R examination for issuance PL (G). DGCA continued to accept the SPL and FRTOL-R related recommendations from M/s JFI. Both are in non-adherence to DGCA CAR Section 7 Series 'B' Part I, issues III.
18. Publication of list of Glider Training Organization is non-adherence to DGCA CAR Section 7 Series 'B' Part I, issues III.
19. The operation of Joy Ride sorties by M/s JFI is a non-adherence to DGCA CAR Section 3 Series 'C' Part III.
20. On the date of accident, M/s JFI neither holds DGCA FTO approval nor hold any DGCA operation permission or NSOP to conduct a commercial flight (Joy ride).
21. On the date of accident, M/s JFI was neither having any operation manual nor Training Procedure Manual approved by DGCA.
22. Post-accident, medical examination was not carried out to ascertain alcohol consumption is a non-adherence to DGCA CAR Section 5 Series F Part III.
23. Organization had communicated to DGCA on several occasion about its flying activities, however DGCA did not respond to any of its communication.

### **3.2 Probable Cause of the Accident**

The Joy ride sortie was convened in a hurry and the pre-flight inspection was not carried out as per documented requirement. Various requirements laid down for safe flight operation were disregarded. Therefore, both fuel valves left unnoticed in closed position. Consequently, the engine stopped just after take-off due to fuel starvation.

***"In view of the above discussion the probable cause of this accident is attributed to the inappropriate aircraft handling (it includes non-adherence to SOPs laid down by DGCA and OEM) and latent Organizational influence."***

The contributory factors to this accident are attributed to the following:

- a) Non-existence of regulation pertaining to Glider training Organization in India. Consequently, no safety oversight of the organization by DGCA.
- b) Lack of safety culture in the organization.
- c) Non adherence to the various DGCA CAR regulation.
- d) Lack of situational awareness, since pilot did not respond as required in the post engine failure situation.
- e) Human factors such as Complacency, Emotional condition (Cognitive factors).

## **4. SAFETY RECOMMENDATIONS**

4.1 The presence of national regulation will compel any organization to bridge the safety gaps and ensures uniform safety standard. Consequently, will enhance the safe aviation landscape in India and will stop the reoccurring of similar accident. Hence, it is recommended that the DGCA may formulate a specific guidelines/CAR to bring all Glider training Organization in India under the ambit of DGCA's Civil Aviation Requirement to ensure uniform safety standard in all Glider training Organization.

4.2 A systematic approach can only be the solution to the human variability and can only ensures the safe ecosystem or Safety culture in an organization. Hence, it is recommended

that the DGCA may ensures annual safety oversight of all FTO indulge in imparting Glider training in India based on the guidelines/CAR formulated as per Safety Recommendation 4.1.

4.3 It is recommended that the DGCA may resolve the issue between the CAR requirement mentioned in Para 3.1 of DGCA CAR Section 7 Series 'B' Part I, issues III, 24th March 2017, and the Glider training Organization list published on its website.

4.4 It is recommended that DGCA may also resolve the issue between the CAR requirement mentioned in Para 3.1 of DGCA CAR Section 7 Series B Part I, Issue III, 24th March 2017 and the SPL/FRTOL-R examination being conducted by Glider Training Organizations for issuance of PL(G) by DGCA.

4.5 It is recommended that the DGCA may issues a comprehensive guideline/regulation to ensure the Safe Glider flying operation for Joy ride in India.

4.6 It is recommended that DGCA may ensure strict compliance of DGCA Air Safety Circular No.3 of 2009 and make it mandatory for all type of General Aviation flying operation in India, by including this Circular in DGCA CAR.

4.7 It is recommended that M/s JFI or Government of Jharkhand, CAD shall adhere to DGCA CAR Section 3 Series 'C' Part III requirement such obtaining DGCA approval for commercial flying before operating any Joy Ride sortie.

4.8 It is recommended that M/s JFI or Government of Jharkhand, CAD shall adhere to all applicable DGCA CAR requirements such as DGCA CAR Section 5 Series F Part III for medical examination and DGCA CAR Section 2 Series X Part II for preparing load and trim sheet etc. before operating any training flying.

Dated: 20 Jan 2025

Place: New Delhi