

**GOVERNMENT OF INDIA  
O/o, DIRECTOR AIR SAFETY, WESTERN REGION,  
NEW INTEGRATED OPERATIONAL OFFICE COMPLEX,  
SAHAR ROAD, VILE PARLE (EAST), MUMBAI**

## **OBJECTIVE**

This investigation is performed in accordance with The Aircraft (Investigation of Accidents and Incidents) Rules 2017 of India.

The sole objective of this investigation is to prevent aircraft accidents and incidents. It is not the purpose of this investigation to apportion blame or liability.

## **FOREWORD**

This document has been prepared based on the evidence collected during the investigation, opinions 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 accidents or incidents could lead to erroneous interpretations.

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**FINAL INVESTIGATION REPORT ON INCIDENT TO**  
**M/s REDBIRD FLYING TRAINING ACADEMY PRIVATE LIMITED,**  
**TECHNAM P2008JC AIRCRAFT, VT-RBC ON 15.06.2021 AT**  
**BARAMATI AIRPORT**

1.	<b>Aircraft Type</b>	Technam P2008JC
2.	<b>Nationality</b>	Indian
3.	<b>Registration</b>	VT-RBC
4.	<b>Owner</b>	M/s Redbird Flying Training Academy Private Limited India
5.	<b>Operator</b>	M/s Redbird Flying Training Academy Private Limited
6.	<b>Pilot-in-Command</b>	Commercial Pilot's License Holder
7.	<b>Extent of Injuries</b>	NIL
8.	<b>Date and Time of Incident</b>	15.06.2021 1526hrs IST
9.	<b>Place of Incident</b>	Baramati Airport
10.	<b>The geographical location of the site of Occurrence (Lat. Long.)</b>	18°13'35.84"N, 74°35'22.9"E
11.	<b>Last point of Departure</b>	Baramati Airport
12.	<b>Intended Place of Landing</b>	Baramati Airport
13.	<b>No. of Passengers On- Board</b>	Nil
14.	<b>Type of Operation</b>	Training Flight
15.	<b>Phase of Operation</b>	Landing
16.	<b>Type of Incident</b>	Abnormal Runway Contact and Hard Landing on Runway

**All timings in this report are in IST.**

## **SYNOPSIS**

On 15<sup>th</sup> June 21, a training flight of a student pilot was authorized by the Chief Flight Instructor of the organization along with an Assistant Flight Instructor, wherein a 4<sup>th</sup> solo check of the student pilot was planned to be conducted by the instructor. During the exercise, the practice of a Glide Approach in a simulated engine failure condition with take-off flaps was planned to be carried out.

During the approach for the landing of the sortie, the instructor brought the engine to idle to simulate engine failure and moved the flaps to take-off position. A stabilized approach was carried out by the student pilot wherein glide speeds of 61-65kts were maintained.

During the final approach, after coming over the threshold, the student pilot made a round-out maneuver at an altitude higher than usual (50 - 70ft approx.). The instructor prompted the student pilot to hold the attitude of the aircraft, however, the student pilot continued to pitch up the aircraft.

After the student pilot continued to pitch up, the instructor took over the controls. To recover and execute a go-around, the instructor gave a pitch-down input to the control column to bring the aircraft to wings level configuration and simultaneously increased the power to full throttle. However, the aircraft had already sunk and made a hard landing on the RH Main Landing gear & Nose Landing gear. Due to the impact overload, the nose landing gear of the aircraft collapsed, and the aircraft veered off to the right before it came to a complete stop after crossing the right edge of the paved surface of the runway.

The Director General of Civil Aviation ordered investigation of the incident by appointing Investigator - In - Charge vide order no DGCA 15018(19)/6/2021-DAS dated 28<sup>th</sup> June 2021 under Rule 13(1) of The Aircraft (Investigation of Accidents and Incidents) Rules 2017.

The delay by the instructor in taking over the controls when a round-out manoeuvre at a higher altitude than normal was made by the student pilot is found as the cause of the incident.



# **1. FACTUAL INFORMATION**

## **1.1 History of Flight**

VT-RBC, a Technam P2008JC aircraft, owned and operated by M/s Redbird Flying Training Academy Private Limited, is used to conduct flying training for student pilot license holders at Baramati Airport, Maharashtra.

On 15.06.2021, the aircraft VT-RBC was certified for release to service after a daily inspection carried out by the AME. On the day of the incident, the aircraft was used by other student pilots and instructors for conducting general circuit and landing exercises. The incident flight was the seventh flight of the day for the aircraft, the third flight of the day for the instructor, and the first flight of the day for the student pilot.

The assistant flight instructor and the student pilot had both reported to the flying academy at approximately 0600IST. The cadet pilot had undergone the breath analyzer examination and was found not under the influence of alcohol. The planned training exercise for the student pilot by the instructor was a 4<sup>th</sup> Solo check in a circuit landing pattern, wherein the practice of a glide approach in simulated engine failure conditions with take-off flaps was planned to be conducted. Post successful completion of the check, the student pilot would be released for a solo flight. On the day before the incident, the student pilot had completed his 3<sup>rd</sup> solo check and a solo flight, wherein, the same exercises were also demonstrated and practiced.

The assistant flight instructor briefed the student pilot on the training exercises which were planned to be conducted before the commencement of the flight. At approximately, 1445 IST, the exterior inspection and the walkaround inspections were conducted by the instructor and the student pilot together. The chocks on the aircraft were removed at 1510 IST. The total fuel onboard the aircraft was 90ltrs before the commencement of the sortie. The cockpit checks before and after the engine startup were accomplished by both the student pilot

and instructor and no abnormalities were found. The aircraft took off with a student pilot and instructor and the same was uneventful.

On the downwind leg, the engine throttle was brought to idle by the instructor to simulate the engine failure and flaps were moved to take-off position. The student pilot then immediately initiated a turn towards the runway for a glide approach and landing.

During the final approach, after coming over the threshold, the student pilot performed the round-out maneuver at an altitude higher than normal (50-70ft approx.). When the high round-out was performed the instructor prompted the student pilot to hold the attitude, however, the student pilot continued to pitch up the aircraft.

The instructor called out and took over the controls. To recover and execute a go-around, the instructor gave a pitch-down input to the control column to bring the aircraft to wings level configuration and simultaneously increased the power to full throttle.

However, the aircraft started to sink and made a hard landing on the runway on its RH main landing gear and the Nose Landing gear. The Nose Landing gear assembly collapsed and got folded under the aircraft. The aircraft touched down on the centerline of the runway, however, started to veer off to the right, during which the propeller struck the runway surface, and the aircraft came to a halt after it had exited the paved surface. The instructor and the student pilot exited the aircraft unhurt.

## 1.2 Injuries to Persons

<b>Injuries</b>	<b>Crew</b>	<b>Passengers</b>	<b>Others</b>
Fatal	0	0	0
Serious	0	0	0
Minor	0	0	0
None	2	0	0

## 1.3 Damage to Aircraft

### 1.3.1 Propeller, Engine, and Firewall

The aircraft had suffered damage to the Nose Landing gear, RH Main Landing gear, bottom engine cowling, and both propellers.



*Figure 1,2,3: Photographs depicting the damage to the propeller.*

Both wooden Propeller blades were found broken at their tips due to impact on the runway. Wrinkles were observed on the bottom side of the firewall. The nose landing support assembly fitting on the Left side of the firewall was damaged and the mounting bolts were bent.

Dents and cracks were formed on both the upper and lower cowling of the engine. The lower cowling was severely damaged, whereas a crack was formed on the upper cowling. The landing and taxiing light was broken and separated from the cowling.

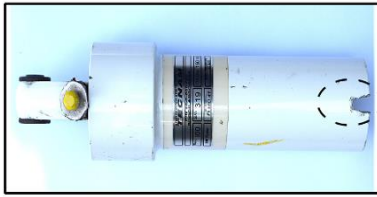


*Figure 4,5,6:  
Photographs of the  
damages on engine  
firewall, Nose Landing  
Gear Attachment points  
and the bottom cowling of  
the engine*

The RH Main landing gear leaf spring assembly had a significant outward bend. The main landing gear inspection caps were not flush with the fuselage skin. The Nose Landing Gear of the aircraft had suffered major damage in the incident. The damages are represented in the diagram given below.



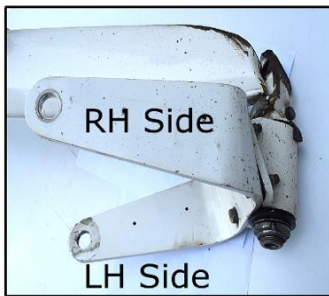
(a) Fracture at lower fitting of oleo



(b) Fracture at oleo-tubular leg attachment



(c) Bent in Fork assembly



(d) Distortion in Central Bushing



(e) Fracture at pivot-tubular leg attachment



Oleo-pneumatic shock absorber

Safety Cable Assembly

Tubular Leg

Pivot

Fork Attachment

Fork

Threaded Axle

(f) Distorted threaded axle

NLG Wheel



Figure 7: Damages observed in General Visual examination of Nose Landing Gear

## 1.4 Other Damage

There was no other damage.

## 1.5 Personnel Information

### 1.5.1 PIC (Instructor)

Age	21 - Male
License	CPL
Date of Issue	07/03/2020
Valid up to	06/03/2025
Category	Aeroplane
Date of Class I Medical Exam	20/06/2020
Class I Medical Valid up to	19/06/2021
Date of Issue of FRTTO Licence	07/03/2020
FRTTO Licence Valid up to	06/03/2025
Total Flying Experience	544:51 hrs
Total Flying Experience on Type	316:21 hrs
Total Flying Experience as PIC on Type	312:16 hrs
Total Flying Experience in the last 1 year	341:06 hrs
Total Flying Experience in last 6 months	317:16 hrs
Total Flying Experience in last 30 days	108:06 hrs
Total Flying Experience in last 7 days	24:56 hrs
Total Flying Experience in last 24 hours	02:21 hrs

Duty Time last 24 hours	09:41 hrs
Rest before the incident flight	12 hrs
Ratings	As PIC: DA-40, DA-42, C-172, Technam P2008

### 1.5.2 Co-pilot (Student pilot)

Age	23 - Male
License	SPL
Date of Issue	14/05/2021
Valid up to	13/05/2026
Category	Aeroplane
Date of Issue of FRTTO Licence	01/06/2021
FRTTO Licence Valid up to	31/05/2031
Total Flying Experience	20:55 hrs
Total Flying Experience as PIC on Type	02:00 hrs
Total Flying Experience in the last 1 year	20:55 hrs
Total Flying Experience in last 6 months	20:55 hrs
Total Flying Experience in last 30 days	20:55 hrs
Total Flying Experience in last 7 days	06:41 hrs
Total Flying Experience in last 24 hours	Nil
Duty Time last 24 hours	09:31 hrs
Rest before the incident flight	12 hours
Ratings	As PIC: Technam P2008JC

## 1.6 Aircraft Information

The details provided below are as of before the incident flight.

Aircraft Registration	VT-RBC
Type of Aircraft	Technam P2008JC
Aircraft Serial No.	1119
State of Manufacturing	Italy
Manufacturing year	2000
Owner	M/s Redbird Flight Training Academy Private Limited E-186, Back Room of Ground Floor, Greater Kailash – I, New Delhi, South Delhi, India – 110048
Operator	Same as Owner
Certificate of Airworthiness number and issue date	7307 – 25.06.2020
ARC number and Validity	4-04/2020-AI(I)/ARC/7307 Valid up to 24.06.2021
A/c TSN	2295:35 hrs
Maximum All Up Weight authorized	650 Kg
Minimum crew necessary	One
Engine Type	Rotax 912S2
Engine SI no.	9139756
Aircraft All up Weight	646 Kg (as per L&T)

The last maintenance on the aircraft was a 50-hour inspection carried out at 2246:30 airframe hours and the next maintenance due was a 100hr inspection to be carried out at 2296:30 airframe hours. The engine had approximately 298 hrs operating time since new. There was no Pilot Defect Report entered in the tech-log book in the past month. Compliance with SB's and AD's and mandatory



modifications was not due on the aircraft. The load and trim sheet indicated that no standard weights as per CAR were used in the calculation, however as per the actual weights of the occupants, the CG and MTOW of the aircraft were found to be within limits.

### **1.7 Meteorological Information**

Baramati Airfield is an uncontrolled airfield and the Air Traffic Management is carried out by the flying training organization. The weather conditions at Baramati are derived by the company. The visibility is estimated by judging the appearance of identified ground features whose distances are known. The winds prevailing are measured using a wind sock and the cloud base is judged visually, however on days with no clear skies, an instructor of the organization gets airborne to check whether the cloud base complies with VMC. The data so obtained is maintained by the company. The weather at the Baramati Airfield 1000Z was a visibility of 6km with scattered clouds at 6000ft and winds heading 270 degrees with a speed of 12kts.

### **1.8 Aids to Navigation:**

Not Applicable to the incident

### **1.9 Communication**

There was always two-way communication established between the communications tower and the aircraft.

### **1.10 Aerodrome Information**

Baramati Airport is located in Baramati, Pune district of Maharashtra state in India. The Airfield is uncontrolled and is currently being used for General aviation and pilot training. The runway is at an elevation of 2000ft, and runway ends are designated as 11/29. The length of the strip is 7700 feet.

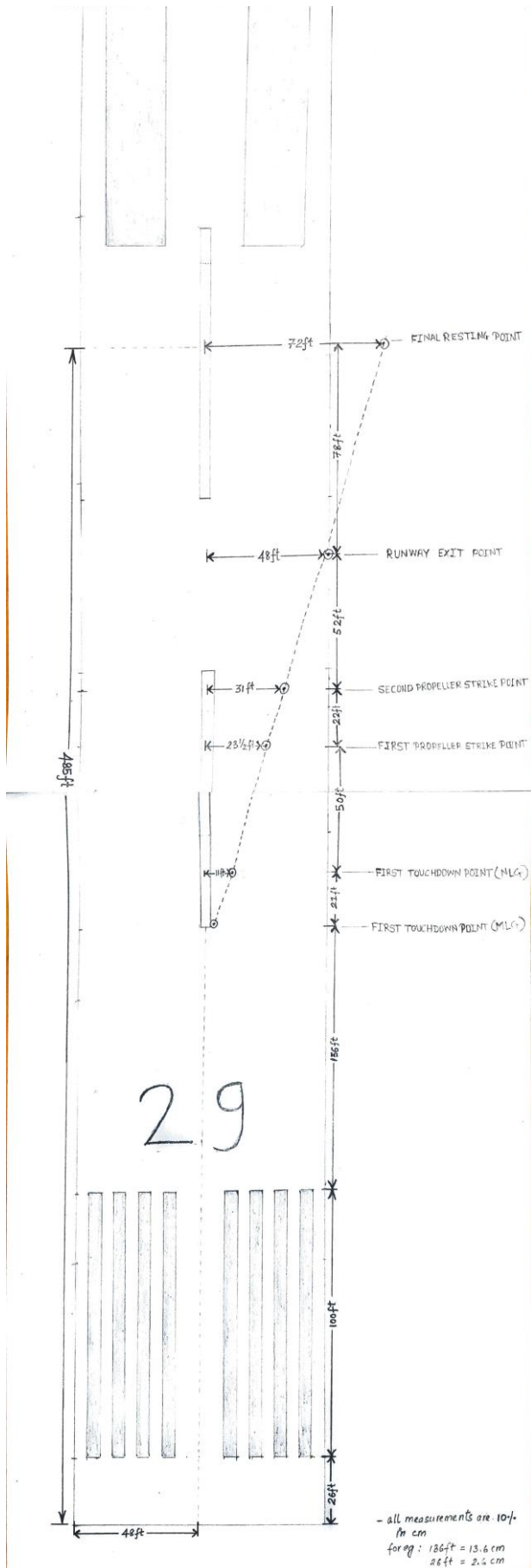
### **1.11 Flight Recorders**

No CVR or FDR is fitted in the aircraft.

## **1.12 Wreckage and impact information**

The aircraft after the incident was moved away from its final resting point into the company hangar before the Investigator – in – Charge could arrive at the site. There were no primary or secondary flight control surfaces of the aircraft which were either disintegrated or propelled away from the aircraft during or before the incident. Based on the markings available on the runway and the description of the eyewitnesses it is established that the aircraft had made contact with the runway on the centreline and then veered off to the right before exiting the runway and coming to a complete halt. After the nose landing gear had fractured and collapsed, the propellers struck the runway multiple times and created identifiable marks. The same is reproduced as described and shown in the images given below.

- The right main landing gear impacted the runway surface near the runway centreline at approximately 136ft from the end of the threshold marking of runway 29.
- The nose landing gear wheel and fork impacted the runway surface, 22ft from the main landing gear touchdown point.
- The propeller struck for the first time on the runway surface at 208ft from the end of the threshold marking of runway 29 and 23.5ft to the right from the runway centre line and the second time at 22ft ahead and 31ft to the right from the runway center line.
- The aircraft exited from the runway at a point 282ft from the end of the threshold marking of runway 29.
- The broken nose landing gear along with the bottom engine cowling scraped the runway surface with the propeller continuously striking the ground. The aircraft came to a halt at a point which is 485ft from the beginning of the runway.



Final Resting Point



Runway Exit Marking



Propeller Strike II



Propeller Strike I



Nose Landing Gear Fork Impact

### **1.13 Medical and pathological information**

Not Applicable

### **1.14 Fire**

There was no fire in the incident

### **1.15 Survival Aspects**

The seatbelts were not damaged and their attachments were intact The incident was survivable.

### **1.16 Tests and research**

The Nose Landing Gear of the aircraft suffered major damage in the incident. The complete assembly along with the wheel and the Oleo–Pneumatic shock absorber were subjected to detailed visual examination and Macro examination using a stereo microscope in DGCA Laboratory. The findings and conclusions are as below.

- The lower fitting of the oleo-pneumatic shock absorber and attachment between the oleo-pneumatic shock absorber and tubular leg were found fractured.
- The RH-side of the fork assembly and RH-side central bushing of the nose wheel was found bent. The central bushing unit was found distorted with a bent and dent mark on the unit.
- The cup (outer ring raceway) of the tapered bearing unit (RH side) was found to have permanent depressions. The rollers within one tapered bearing unit (RH side) were found to have brinelling marks and pitting corrosion.
- There were no abnormal rubbing marks found on the wheel tire. The wheel rim units were also found to be in satisfactory condition.
- The threaded axle was found distorted with damaged threads, rub marks, and pitting corrosion signatures.

- A significant fracture was found on the attachment between the pivot and tubular leg. Rub marks were observed on the pivot of the NLG assembly and the tubular leg with the signature of pitting corrosion. Slant and fibrous features were found on the fractured surface of the tubular leg.
- The fractured surface of the oleo-pneumatic shock absorber and the fragmented fracture portion of the tubular leg was examined under a Scanning Electron Microscope (SEM) and dimple signatures were observed.
- The presence of slant and fibrous features on the fracture portion of the tubular leg and dimple signatures observed on the fracture portion of the oleo-pneumatic shock absorber and tubular leg is indicative of overloading on NLG parts.
- As a result of the overloading, the attachment between the tubular leg and pivot got fractured and the threaded axle experienced unequal stresses leading to several damages.

### **1.17 Organizational and Management Information**

Redbird Flying Training Academy is a flying school approved by DGCA. It operates from its main base at Baramati Airfield. The organization operates both single and multi-engine land airplanes for training purposes. Its fleet consists of 06 Technam P2008JC, single-engine aircraft, 01 Cessna 172 aircraft, and 01 Technam P2006 multi-engine aircraft.

The weights of the crew applied in the load and trim sheet of the incident flight were not the standard weights as approved in the weight schedule and required by CAR but actual weights were applied as per the note, *“As per CAR Section 2 Series X Part II, exact weights of pilot and baggage must be used”*. in the DGCA approved Load and Trim sheet. Load and Trim sheets of sorties conducted by all the instructors of the organization were sought at random and

perusal of the same revealed several faults and findings, which are as mentioned below.

**1.17.1.** The DGCA approved load and trim sheet of the organization contains a note which indicates that the exact weight of the pilots is to be used whilst preparing the load and trim sheet, whereas the DGCA approved weight schedule indicates the weight of the crew as 85kg as per CAR, which is contrary to each other. The note in the DGCA approved load and trim sheet is also in contravention of CAR Section 2 Series X Part II, Para 10.1.

**1.17.2.** The weight of the aircraft documents in the DGCA approved weight schedules of VT-RBC, VT-RBD, and VT-RBE, was not included in the empty weight of the aircraft but mentioned separately in the weight of removable equipment.

**1.17.3.** From the random sample of Load and Trim sheets, it was established that the Chief Flying Instructor/Accountable Manager of the organization manipulated the weight in the load sheet as PIC on several occasions to keep the total weight of the aircraft within the maximum certified take-off weight.

**1.17.4** The Chief Flying Instructor/Accountable Manager of the organization conducted flying sorties whose load and trim had an exceedance of Maximum Take-off weight thereby violating subrule 2(a) of Rule 58 of The Aircraft Rules 1937 on several occasions.

## **1.18 Additional Information**

### **1.18.1 Flying Training Progress Record**

- There were no abnormal remarks found in the FTPR of the student pilot for the total 21 hours of flying training conducted.
- The complete flying training of the student pilot was conducted by the same instructor involved in the incident, except for the first solo check.
- On the day before the incident, the student pilot was subjected to a 3<sup>rd</sup> solo check after which a satisfactory solo flight was also performed. The Demo exercises conducted during this exercise were Rejected Take off at 50kts,

Engine failure after Take Off and practiced exercises were partial flaps and flapless circuits, and engine failure on downwind with discussion on forward slips.

#### **1.18.2 Excerpts from the Statements of the Instructor**

- The instructor stated that before the incident, two instructional sorties were conducted for two different student pilots and both sorties were uneventful.
- The incident sortie was conducted after lunch and a briefing of the exercise was given by the instructor to the student pilot before the commencement of the sortie.
- Pre-Flight Checks, Taxi, and Take-off of the incident flight were uneventful.
- On the downwind leg, the instructor had reduced power to idle to simulate an engine failure and practice the Glide Approach.
- The student pilot then immediately initiated a turn toward the runway. The student pilot maintained glide speeds of 61 - 65kts.
- The student pilot identified the touchdown point and maintained the approach. All the engine parameters were normal.
- The student pilot after coming over the threshold performed the round-out maneuver at a higher altitude than normal (approximately 50-70ft). When the same was noticed the instructor called out to the student pilot to hold the attitude of the aircraft, but the student pilot continued to pitch up the aircraft.
- Realizing that the aircraft might stall, the instructor had taken over the controls and gave a pitch-down input to the control column to bring the aircraft to wings level configuration and simultaneously increased the power to full throttle to perform a go-around, however, the aircraft started sinking towards the runway.

### **1.18.3 Excerpts from the Statements of the Student Pilot**

- The student pilot stated that he had reported to the base for flying training activity at 0600hrs IST on the day of the incident.
- The student pilot was briefed about the exercise by the instructor before the commencement of the sortie.
- The pre-flight activities were carried out by both the instructor and the student pilot. The take-off of the incident sortie was uneventful.
- On downwind, the instructor brought the throttle lever to Idle and flaps to take-off position and informed the student pilot to maintain a glide speed of 61kts.
- On finals, the student pilot maintained centerline and wings level and as a sink was felt, the student pilot gave a pitch-up input to the control column.
- The instructor had initially called out that the approach was high and then later took over the controls.
- The instructor tried to recover by opening full power for a go-around, however, the nose wheel had touched the ground already.
- After touchdown, the aircraft veered off to the right of the runway. Once the aircraft had come to a full stop, the engine was shut off and secured. The student pilot along with the instructor exited the aircraft unhurt.

### **1.18.4 Weight and Balance - Civil Aviation Requirements and Industry Practices**

Para 10 of the DGCA CAR Section 2 Series X Part II, require that a standard weight of 85 kg for crew and 75 kg for passengers are to be applied for calculation of load and trim sheets. Further the CAR also stipulates that in case of aircraft's whose Maximum Take Off weight is below 2000kg, the actual weight of passengers may be considered for calculation of the load and trim sheet.



In January 2023, an additional Para 10.3 was included in the said CAR which allowed all the helicopters, irrespective of their All-up weight, to calculate the load and trim sheet using actual weight of crew, passengers, and baggage. As confirmed from a maximum number of the approved flying training organizations in operating in India, the actual weights of the instructor and trainee are being used for calculation of load and trim sheets even though they are aware that it is against the CAR provisions.

### **1.19 New Investigation Techniques**

None

## **2. ANALYSIS**

### **2.1 Airworthiness of the Aircraft**

At the time of the incident, the aircraft's Certificate of Registration, Certificate of Airworthiness, and Airworthiness Review Certificate were valid and current as per applicable CAR. All concerned Airworthiness Directives, mandatory Service Bulletins, and DGCA Mandatory Modifications on this aircraft and its engines were complied with as of the date of the incident. The aircraft was airworthy as per available records. The load and trim sheet for solo check (dual flying) was prepared by the instructor and it was found that instead of using standard weights as required by the CAR actual weights of the crew were used owing to the note in the DGCA approved Load and Trim sheets. These weights when verified with the latest medicals of the crew, were found approximately the same. However, the CG and the MTOW were found within the limits.

Further to the above, During random checks of load and trim sheets of all the sorties conducted in the organization, it was observed that none of the instructors or the trainee pilots in the organization use the standard weights as per CAR Section 2 Series X part II, Para 10, whilst preparing the load and trim sheet. This was probably due to incorrect interpretation of the CAR Section 2 Series X

Part II, Para 10.2 and a note in the DGCA approved load and trim sheet copy of the organization, which is contrary to the above mentioned CAR requirements. In these randomly selected load and trim sheets it was found and established that the Chief Flight Instructor/Accountable Manager had violated the subrule 2(a) of Rule 58 of The Aircraft Rules 1937, by carrying out sorties on aircrafts whose take-off weight was beyond the certified MTOW. It was also found that the Chief Flying Instructor had also manipulated the weight on several occasions to keep the take-off weight of the aircraft below the certified MTOW. All the above are violations of The Aircraft Rules and the Civil Aviation Requirements and they are not found to be contributory factors to the incident.

The crew stated that all the engine parameters throughout the flight were normal and based on the marks created by the propeller strikes on the runway, it is established that the engine was delivering power.

Given the above, it is concluded that the aircraft serviceability was not a contributory factor to the incident.

## **2.2 Hard Landing**

In the lab examination of the damaged nose landing gear, it was concluded that the attachment between the tubular leg and pivot got fractured as the threaded axle experienced unequal stresses leading to several damages. Further, the presence of slant and fibrous features on the fractured portion of the tubular leg and the dimple signatures observed on the fracture portion of the oleo-pneumatic shock absorber and tubular leg is indicative of overloading on NLG parts. There was also a bend found in the right main landing gear leaf spring and a protrusion of the main landing gear inspection points. All of the above indicate a hard impact on the nose and main landing gear of the aircraft.

At the moment of hard impact with the ground, the oleo-pneumatic shock absorber on the nose landing gear fractured causing the nose landing gear to collapse and fold under the Engine cowling of the aircraft. These damaged NLG parts continued to get rubbed on the runway and ground until the aircraft had

come to halt. The propeller marks on the runway were found consistent with an engine on power and substantiate the statement of the instructor with regards to increasing the power for a go-around.

The tubular leg and pivot suffered a greater extent of damage due to rubbing on the ground. The bottom cap of the oleo-pneumatic shock absorber also made a contact with the ground and experienced significant damage and rub marks.

Due to the same impact on NLG, the nose wheel was disintegrated from the fork assembly resulting in a bend in the RH-side of the fork, and RH-side central bushing of the nose wheel. The tapered roller bearing unit (RH side) also suffered overload leading to brinelling from impact on roller units and depression on the outer ring raceway. Markings and rubber deposits consistent with the disintegration of the nose wheel with a bend onto the RH side were also found on the runway.

The statements of the crew about the sequence of events corroborate with the findings of markings found on the runway and the amount of damage found on the landing gear.

Based on the above, it is concluded that the aircraft made a hard landing on the RH Main Landing gear and Nose Landing gear with engine power on. The RH Main Landing gear was bent, and the Nose Landing gear collapsed due to the impact on landing.

### **2.3 Operational Aspects**

The incident sortie was the third sortie for the instructor and the first sortie for the student pilot. Before the commencement of the sortie, a proper briefing of the exercise was conducted by the instructor. The exercise briefed and being conducted was a gliding approach with simulated engine failure on take-off flaps. The student pilot had completed demos and practice exercises of engine failure on the day before the incident and was also trained in go-around procedures.

The take-off was uneventful and on downwind the instructor brought the throttle lever to the idle position to simulate an engine failure condition and

moved the flaps to take-off position. The student pilot initiated the turn onto the runway and continued to maintain glide speeds of 61-65kts, which are the minimum speeds mentioned in the AFM for Engine Failure after take-off.

During the approach, after coming over the threshold, the student pilot performed the round-out manoeuvre at a higher altitude than normal, at which point the instructor prompted the student pilot to hold the attitude. The moment the student pilot had conducted the round-out manoeuvre at a higher altitude than normal, which in itself is an undesirable manoeuvre, the instructor did not take over the controls immediately but prompted the student pilot to hold the attitude.

As the student pilot continued to pitch up the aircraft, the take-off flaps configuration on the aircraft increased the drag force acting on the aircraft which dissipated the airspeed rapidly and the aircraft started sinking.

To recover, the instructor took over the controls and gave a pitch-down input to the control column to bring the aircraft to wings level configuration and simultaneously increased the power to full throttle to execute a go-around. However, due to reduced airspeed, the aircraft sank and made a hard landing on the runway.

Considering the low experience of the student pilot, the duty of the instructor during a check remains supervisory, especially during the critical phases of the flight. When an undesirable manoeuvre, i.e., Round out at High altitude, was performed by the student pilot, the instructor should have either, reacted immediately to take over the controls and performed a go-around and re-do the approach exercise or instructed the student pilot to perform a go-around manoeuvre. The instructor in this case had done neither but asked the student pilot to hold the attitude. Given the above, the delay by the instructor in taking over the controls is concluded to be the cause of the incident.

## **2.4 Civil Aviation Requirements, DGCA Approvals and Industry Practices**

Para 10 of DGCA CAR Section 2 Series X Part II stipulate that actual weight of passengers may be considered for calculation of the load and trim sheet in case of aircraft's whose Maximum Take Off weight is below 2000kg.

However, it does not specifically lay down the requirement to be followed by the flying training organizations to use actual weights of the instructor and trainee for calculation of the load and trim sheet, even though the Maximum take-off weight of the aircraft used for flying training activity is below 2000kg.

It has been seen that most of the approved flying training organizations in India are using actual weights of the instructor and trainee pilots. Also, the DGCA approved load and trim sheet of the organization contains a note which indicates that the exact weight of the pilots is to be used whilst preparing the load and trim sheet, whereas the DGCA approved weight schedule prescribes the weight of the crew as 85kg as per CAR, which is contrary to each other. The note in the DGCA approved load and trim sheet is also in contravention of CAR Section 2 Series X Part II, Para 10.1.

Though, the weight and balance of the aircraft is not the contributory factor of the incident, the review of the Para 10 of CAR Section 2 Series X Part II may be considered to include actual weight of instructor and trainee pilots by flying training organizations provided arrangements are ensured by the FTO for passenger weighment with sufficient accuracy.

## **3. CONCLUSION**

### **3.1 Findings**

**3.1.1** The aircraft was airworthy before the incident. The incident flight was the seventh flight of the day for the aircraft, the third flight of the day for the instructor, and the first flight of the day for the student pilot.

**3.1.2** The C.G. and MTOW of the incident flight were found within the approved limits of the aircraft.

**3.1.3** During the approach, the student pilot performed a round-out maneuver at a higher altitude than normal.

**3.1.4** When the student pilot performed a round-out maneuver at an altitude higher than normal, which is undesirable, the instructor prompted to hold the attitude of the aircraft instead of either taking over the controls immediately or calling out and instructing the student pilot to perform a go-around.

**3.1.5** Even after the instructor had prompted the student pilot to hold the aircraft, the student pilot continued to pitch up the aircraft. When the student pilot continued to pitch up, the instructor took over the controls

**3.1.6** In order to recover and execute a go-around, the instructor gave a pitch-down input to the control column to bring the aircraft to wings level configuration and simultaneously increased the power to full throttle, however due to the reduced airspeed, the aircraft sank and made a hard landing on the runway.

**3.1.7** During landing, the aircraft made hard contact with the ground, on the RH main landing gear and the nose landing gear, with an impact/overload. As a result, RH main landing gear had bent and the attachment between the tubular leg and pivot of the Nose landing gear got fractured as the threaded axle experienced unequal stresses leading to several damages.

**3.1.8** The nose landing gear collapsed, and the nose wheel was separated from the nose landing gear.

**3.1.9** Further, propellers struck the runway on several occasions and the aircraft veered off the runway to the right. The aircraft came to a full stop just after the aircraft left the paved surface.

**3.1.10** The note in the DGCA approved Load and Trim Sheet of the organization with regards to the usage of the exact weight of pilot and baggage whilst calculating the C.G and MTOW was found not in coherence with the approved weight schedule and not in compliance with the CAR.

**3.1.11** The Chief Flying Instructor/Accountable Manager of the organization had manipulated his weight in the load sheet to keep the total weight of the aircraft within the maximum certified take-off weight.

**3.1.12** The Chief Flying Instructor/Accountable Manager of the organization had violated subrule 2(a) of Rule 58 of The Aircraft Rules 1937.

### **3.2 Cause of the Incident**

The delay by the instructor in taking over the controls when an undesirable high round-out manoeuvre was made by the student pilot is found as the cause of the incident.

## **4. SAFETY RECOMMENDATIONS**

**4.1** The provisions of CAR Section 2 Series X Part II, Para 10 may be reviewed to allow the flying training organizations to use actual weights of crew and baggage in the calculation of load and trim sheet.

**4.2** Action as deemed fit by DGCA Hqrs for the findings mentioned above.

**Rohith Mitai**  
**Investigator-In-Charge**