



सत्यमेव जयते

GOVERNMENT OF INDIA

**FINAL INVESTIGATION REPORT ON INCIDENT
TO M/S OPEN SKIES AVIATION PVT. LTD.,
MAULE MT-7-235 AIRCRAFT VT-MAT, WHILE
LANDING AT BARAMATI AIRPORT ON
12.03.2018.**

FOREWORD

In accordance with Annex 13 to the International Civil Aviation Organisation Convention and the Aircraft (Investigation of Accidents & Incidents) Rules 2017, the sole objective of this investigation is to prevent aviation incidents and accidents in the future. It is not the purpose of the investigation to apportion blame or liability.

This report has been prepared based upon the evidences collected during the investigation and opinions obtained from the experts. Consequently, the use of this report for any purpose other than for the prevention of future incidents /accidents, could lead to erroneous interpretations.

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**FINAL INVESTIGATION REPORT ON INCIDENT TO M/S OPEN SKIES AVIATION
PVT. LTD., MAULE MT-7-235 AIRCRAFT VT-MAT, WHILE LANDING AT BARAMATI
AIRPORT ON 12.03.2018**

- | | | |
|---|--------------------|---|
| 1. Aircraft | Type | : MAULE AEROSPACE TECHNOLOGY, INC. |
| | Model | : MAULE-MT-7-235 |
| | Nationality | : Indian |
| | Registration | : VT-MAT |
| 2. Owner | | : M/s Open Skies Aviation Pvt. Ltd. |
| 3. Operator or hirer | | : M/s Open Skies Aviation Pvt. Ltd. |
| 4. Pilot in command | | : PPL holder |
| | Extent of injuries | : Nil |
| 5. Date of incident | | : 12.03.2018 |
| 6. Time of incident | | : 18:38 Hrs IST |
| 7. Last point of departure | | : Juhu Airport (VAJJ) |
| 8. Point of intended landing &
Geographical location | | : Baramati Airport &
18° 13' 471N, 74° 35' 484 E |
| 9. Type of Operation | | : Private |
| 10. Crew on board | | : 01 |
| | Extent of injuries | : Nil |
| 12. Passengers on board | | : 03 |
| | Extent of injuries | : Nil |
| 13. Phase of Operation | | : Landing |
| 14. Type of Incident | | : ARC: Abnormal Runway Contact |

(All Timings in the report are in IST)

SYNOPSIS

On 12.03.2018, M/s Open Skies Aviation Pvt. Ltd., Maule MT-7-235 aircraft registration VT-MAT under private category operating flight Juhu-Baramati as single pilot operation, was involved in incident at Baramati Airfield. The pilot was holding valid PPL (Private Pilot Licence). The subject aircraft took off at 1714 hrs from Juhu and landed on RWY 11 at Baramati around 1838 hrs. Aircraft has touchdown and bounced into the air, then the nose dropped and aircraft touchdown runway again with high impact on the nose landing gear resulted into the nose wheel oleo strut fracture. Subsequently the propeller blades strike the runway surface and there after the nose landing gear collapsed immediately; Due to several strikes of propeller, all the three propeller blades bent inwards and got damaged. The aircraft finally stopped to the left of the runway center line 2000ft from the threshold of Runway 11. There were 04 persons on board the aircraft including 01 pilot and no injury to any of the occupants. There was no fire.

The incident was reported by M/s Open Skies Aviation Pvt. Ltd. to DGCA and AAIB. Subsequently the investigation was ordered by DGCA under Rule 13(1) of the Aircraft (Investigation of Accidents and Incidents) Rules, 2017, by appointing the Investigator in-Charge vide DGCA Order No DGCA-15018(18)/1/2018-DAS dated 02.04.2018. The incident was caused due to the incorrect flare and bounce recovery technique by the PIC during landing.

1. FACTUAL INFORMATION:

1.1 History of the flight:

On 12/03/2018, M/s Open Skies Aviation Pvt. Ltd., Maule MT-7-235 aircraft registration VT-MAT under private category operating flight Juhu - Baramati as single pilot operation was involved in incident. The flight was operated by pilot holding valid Private Pilot Licence (PPL) with open rating on all conventional airplanes having all up weight not exceeding 1500Kgs. The pilot had carried out two familiarization flights on 10th & 11th March 2018 under supervision of Dy CFI as PIC on this aircraft before operating the incident flight. The pre-flight inspection of aircraft was carried out by the pilot (without any authorization) before operating the sector Juhu - Baramati and the aircraft took off at 1714 hrs from Juhu.

The take off and the en-route flight from Juhu to Baramati was uneventful. During in bound Baramati the pilot took briefing from ATC Baramati for approach of runway 11. Weather reported was calm with visibility of 6000 meters.

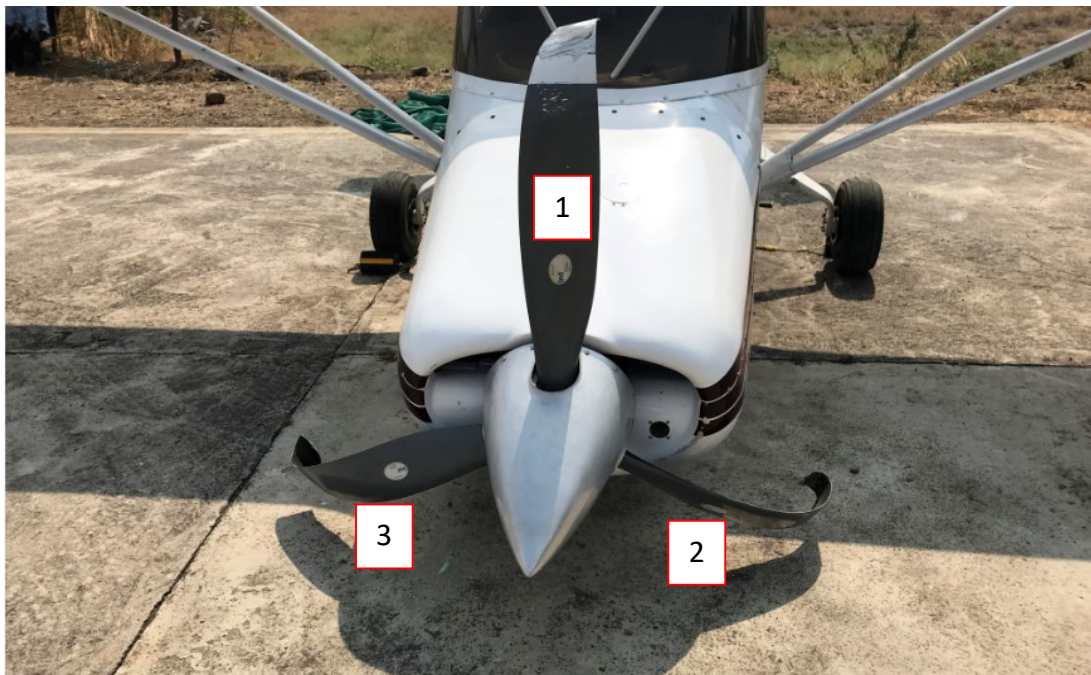
The aircraft landed on RWY 11 at Baramati airfield around 1838 hrs. Aircraft has touched down and bounced into the air, simultaneously the tail hook strikes the runway surface. Subsequently nose dropped and aircraft touchdown RWY again with high impact on the nose landing gear and the nose wheel oleo strut fractured. At the same time the propeller blades strike the runway surface and thereafter the nose landing gear collapsed immediately; due to several strikes of propeller, all the three propeller blades bent inwards and got damaged. The aircraft started dragging on the nose landing gear oleo strut & bottom portion of the engine cowling, and finally stopped to the left of the runway center line which is 2000ft distance from the threshold of RWY 11. Nose wheel oleo strut assembly was found sheared off from the base of the landing gear at the lower attachment point of torque link and the bottom portion of the engine cowling was damaged due to continuous dragging on the runway. The tail (mooring) was found with the rub mark. No other damage to the aircraft structure is visible. The hydraulic oil leak was observed at the point of the first impact & propeller blade strike. The fuel leak was observed from the left side of the left-wing tank vent where the aircraft has finally stopped on the runway. However, there was no fire. The distance from the hydraulic oil leak on impact to the nose landing gear collapse is 34 feet and the distance from the nose landing gear collapse to the aircraft stopping point on the runway surface is 245 feet. There were 04 persons on board the aircraft including 01 pilot and no injury to any of the occupants.

1.2 Injuries to persons:

Injuries	Crew	Passengers	Others
Fatal	NIL	NIL	NIL
Serious	NIL	NIL	NIL
Minor	NIL	NIL	NIL
None	01	03	NIL

1.3 Damage to Aircraft:

1. All three propeller blades were severely bent inwards and damaged explicitly (as shown in Picture 1)
2. Nose landing gear oleo strut sheared off from the base of the landing gear at the lower attachment point of torque link (as shown in Picture 2 & 3)
3. Tail (mooring) has got rub mark on tail touchdown (as shown in Picture 4)
4. Bottom portion of engine cowling damaged (as shown in Picture 5)



Picture 1 - All the three propeller blades (1, 2 &3) strike runway and bent inwards



Picture 2–Nose Landing Gear collapse and the oleo strut shear off



Picture 3 – Nose Landing Gear Oleo strut shear off from the lower attachment of torque link



Picture 4–Tail (mooring) rubs off during touchdown



Picture 5 – Bottom portion of the engine cowling damage

1.4 Other damage:

Runway surface was damaged due to several strikes of the propeller blades and dragging of bottom portion of engine cowling as nose landing gear bogged down.

1.5 Personnel information:

Details	Commander
Age/Gender	67years 3 months/Male
Date of licence issue	24.11.1993
Valid up to	04.03.2028
Category	PPL
Endorsement as PIC	with open rating on all conventional aeroplane having all up weight not exceeding 1500Kg
Class of Medical	Class 2
Date of Medical Exam	07.01.2017
Medical Exam validity	06.01.2019
FRTOL valid up to	02.03.2019
Total Flying Experience	26200
Experience on Type	02:00
Experience as PIC on Type	NIL
Last flown on Type	12.03.2018
Total flying experience in last 365 days	06:20
Total flying experience in last 180 days	06:20
Total flying experience in last 90 days	06:20
Total flying experience in last 30 days	04:20
Total flying experience in last 7 days	02:00
Total flying experience in last 24 Hrs	0:50
English Language Proficiency Level	6
Previous incident History, if any	NIL

The pilot started flying in 1974 with Indian Air Force (IAF) on HT-2 aircraft & did flying instructors' course on aircraft HT-2 a Tail dragger in 1980. As per the records the involved pilot acquired DGCA licence in 1984 & acquired PPL on 24.11.1993 with endorsement on Piper Cub J3C, Cessna 152, Cessna 172, Beech Bonanza B-25, Beech Baron B55, Pilatus PC-12, Beech 200 and with open rating Up to 1500Kgs. He also holds five helicopter licenses i.e. ATPL (H)s of the world (FAA, Nigeria, Macau, Hong Kong and Indian ALTP (H)). He has flown across the globe and been a QFI, Instructor, Examiner, Chief Flying Instructor and he also holds FAA PPL aero planes.

From the Pilot log book, it is observed that pilot did not fly the airplane from 21.03.2009 to 21.12.2017. On 22.12.2017 for Private Pilot Licence (PPL) renewal and recency requirement, pilot has undergone Ground refresher training, Familiarization flight and Skill test on VT-PTJ (Cessna-152) at Falcon Aviation Academy, Faizabad.

On 10th & 11th March 2018, Pilot has undergone two familiarization flights as First Officer on VT-MAT (Maule MT-7-235) for duration of 1 hour 10 minutes & 50 minutes respectively with the Dy.CFI of M/s Bombay Flying Club Ltd. On 12.03.2018, Pilot has flown the aircraft as PIC to Baramati. Pilot has never flown this aircraft (Maule MT-7-235) before 10.03.2018.

The pilot has carried out the class II medical on 07.01.2017, at that time his age was 66 years 02 months. DGCA HQ's Medical cell has given the validity of Medical Assessment for two years i.e. till 06.01.2019 vide file no. 1-691/1982-L-2 dated 30.01.2017 wherein it was to be given for one year as per The Aircraft Rules 1937 Part V 39C Sub rule 5(b) - Period of validity of medical fitness Assessment and Licences.

The pilot was not involved in any serious incident/ accident in the past. The licences and training of the involved pilot were current and valid other than the Medical Certificate. The FDTL/FTL requirements were met.

1.6 Aircraft Information:

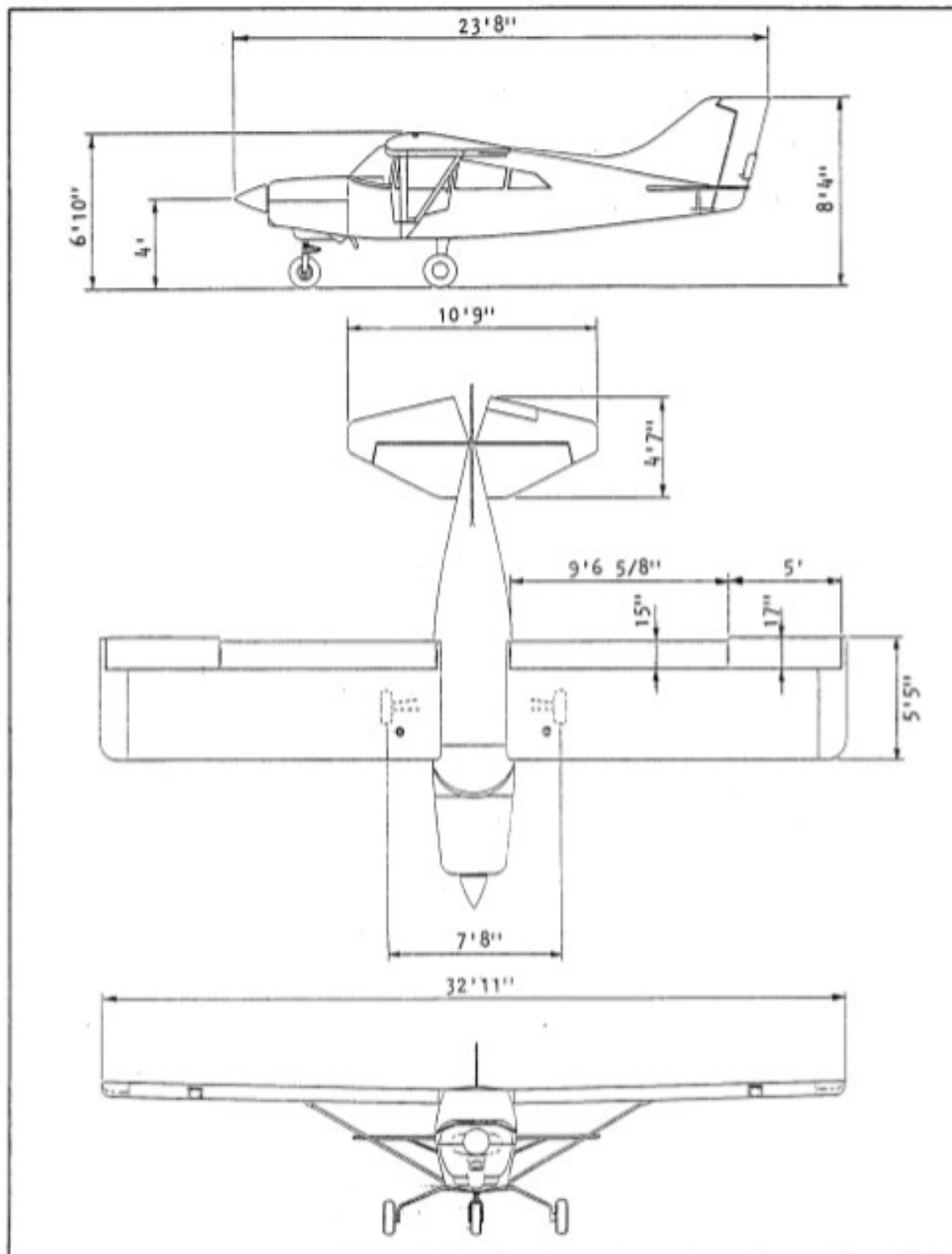
1.6.1 General Information:

Aircraft is five-seater (including pilot) high wing cabin monoplane fitted with single tractor engine (with 03 propeller blades) in nose of fuselage. This is a light & STOL (Short Take-off & Landing) aircraft. Wing is a strut braced two spar, metal covered, modified USA 35-B airfoil & fiber glass wing tips. Fuselage is welded steel tube structure. Fuselage and tail group covered with ceconite synthetic fabric and fiberglass engine cowl. Forward fuselage and doors are with aluminum skin. Landing gear (tricycle wheeled undercarriage) is a fixed type and an Air-Oil nose wheel oleo strut steerable from rudder pedals. Main gear is spring aluminum with Hydraulics brakes. Control systems – dual control wheels, rudder pedals and brakes. All controls directly cable driven. Fuel control/shut off valve is at the left lower side panel. Mechanical flap and trim controls are at the center on the floor. All other controls, switches, etc., are instrument panel mounted. The cruise speed is 164 mph and range of 1,001 miles (1,610 km).



MAULE AEROSPACE TECHNOLOGY, INC.
AIRPLANE FLIGHT MANUAL
MAULE MT-7-235

SECTION I
GENERAL



Photograph-6 MAULE MT-7-235 aircraft External dimensions as shown

1.6.2 Aircraft Details:

Aircraft Registration	VT-MAT
Manufacturer	Maule Air Inc., USA
Type	Maule-MT-7-235
Aircraft S.no.	18086C
Year of Manufacture	2004
Certificate of Airworthiness (CoA)	6261, Issued on 14.01.2013
Airworthiness Review Certificate Validity	22/06/2018
Engine Type	Lycoming IO-540-WIA5
Engine S.no.	L-28838-48A
Propeller Type	HZ-HC-C3YR-1RF-7693
Propeller S.no.	DY5914B
Aircraft TSN (as on 11/03/18)	567:36 Hrs
Engine TSN (as on 11/03/18)	567:36 Hrs
Engine TSO (as on 11/03/18)	19:10 Hrs
Propeller TSN (as on 11/03/18)	567:36 Hrs
Propeller TSO (as on 11/03/18)	19:10 Hrs
Empty Weight	1,500 lbs (791.07Kgs)
Maximum all up weight/MTOW	2,500 lbs (1,134Kgs)
Actual take-off weight	2,490 lbs (1,129.4Kgs)
Maximum Landing weight	2,500 lbs (1134Kgs)
Actual Landing weight	2,353.2 lbs (1067.4Kgs)

The aircraft was issued Certificate of Airworthiness number 6261 under NORMAL category, sub-division PRIVATE by DGCA. The aircraft was operated under Private category. Prior to flight the aircraft was holding a valid Certificate of Flight Release. The aircraft and Engine were being maintained by M/s Bombay Flying Club Ltd. under continuous maintenance as per maintenance program consisting of calendar period-based maintenance and flying Hours / Cycles based maintenance as per maintenance program approved by DGCA. Last maintenance check: 50 Hrs / 01-month inspection was carried out at 565:36Hrs on 16.02.2018 and the CRS (Certificate of Release to Service) was issued on the same date. There was no maintenance carried out on the nose wheel landing gear oleo strut in this check.

The defect record of the aircraft was scrutinized and observed that no MEL was invoked on the aircraft & no defect was pending on the aircraft prior to the incident flight.

Pilot has carried out Pre-flight inspection of the aircraft before flying on 12.03.2018 without any authorization from the quality manager of M/s Bombay Flying Club Ltd.

Operator was not having approval of Load & trim sheet from DGCA and also doesn't have the Operations Manual. Pilots prepare the Load & Trim sheet based on the OEM Pilot hand book procedures for the operating flights. As per the DGCA CAR Section 8 Series D Part I Para 15.1 (Rev 3, 20th Dec 2015) *"Before starting operation the operator shall prepare a load/trim sheet and get the same approved from the DGCA (Dte of Airworthiness)."*

1.7 Meteorological information:

There is no Indian Metrological Department (IMD) Metrological (MET) office situated at Baramati Airfield. Nearest MET office is at Pune Airfield which is at a distance of 44 NM. To have a better control & system functioning M/s Carver Aviation has setup their own ATC station which is manned by the personnel of their organization. ATC, Baramati uses Davis Vintage Pro 2 instrument to monitor wind Speed, Wind Direction, Humidity, Temp., Dew Point, forecast etc.

The METAR recorded on register at 1830 hrs on 12.03.2018 was with winds 05 knots at 100°, visibility 6000 meters, temp 32 deg C and dew point 06° C, no significant clouds and QNH 1006 Hpa.

1.8 Aids to navigation:

There is no Navigational aid available at Baramati airfield other than the windsock and aerodrome beacon.

1.9 Communications:

On 12.03.2018 communication was handled by M/s Academy of Carver Aviation Pvt. Ltd. personnel (CPL holder) who were positioned at ATC tower. There was always two-way communications between the aircraft and the Baramati ATC at frequency 129.25 MHz and aircraft had reported all operations normal. However, there is no recording facility for ATC Communication.

1.10 Aerodrome information:

Baramati Airfield is located in Pune district of Maharashtra state in India. The Baramati Airfield is owned by Maharashtra Industrial Development Corporation (MIDC) and given on lease to M/s Reliance Airport Developers Private Limited, Mumbai. Elevation of the airfield is 604 meters MSL and is spread over an area of 182.5 hectares (451.11 Acres). There is one Runway with orientation 11/29 having length of 5800 feet and 150ft wide with turning pads at both ends. The Runway surface is made of 11 Bitumen and runway Strength is 16 LCN. Three taxiways connect airstrip to two adjacent aprons measuring 180 by 100 meters and 100 by 75 meters. The airfield has a 112 square meter terminal building and approach road.

Both Runway directions are in use depending upon the wind direction. The strip is an uncontrolled airfield. M/s Academy of Carver Aviation Pvt. Ltd. has set up local ATC which is manned by the Pilots of flying club. Other than the aerodrome beacon and the wind sock there are no navigational aids available on the airfield. The emergency services i.e. the fire fighting vehicle and the medical emergency is manned by the M/s Carver Aviation personnel. The elevation of Baramati Airfield is 1995 feet. There are three Windsocks installed near the Runway, one each at Runway 11 & 29 end and other near middle of Runway. The Baramati airfield is not Licenced by DGCA.

1.11 Flight Recorders:

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

1.12 Wreckage and Impact Information:

The aircraft landed on RWY and bounced into the air, simultaneously the tail hook contact with the runway surface. Subsequently nose dropped and aircraft touchdown RWY again with high impact on the nose landing gear and the nose wheel oleo strut fractured. Then the propeller blades strike the runway surface 09 times and there after the nose landing gear collapsed immediately; due to several strikes of propeller, all the three propeller blades bent inwards and got damaged. After NLG collapse, the aircraft started dragging on the nose landing gear oleo strut & bottom portion of the engine cowling and finally stopped to the left of the runway centre line. The distance from the nose gear collapse to the aircraft stopping point on the runway surface is 245feet. Nose wheel oleo strut assembly was found sheared off from the base of the landing gear at the lower attachment point of torque link and the bottom portion of the engine cowling was damaged due to continuous dragging on the runway. No other damage to the aircraft

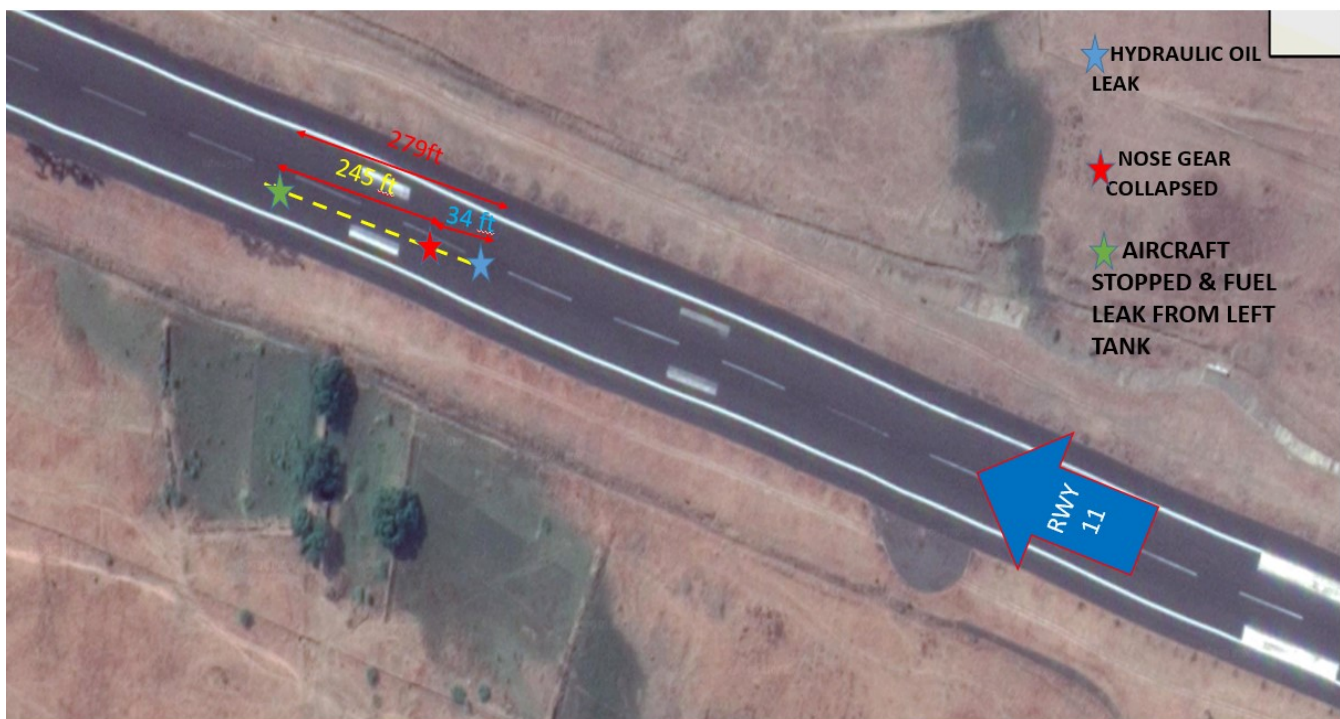
structure is visible. The hydraulic oil leak was observed at the point where the first impact & propeller blade strike and fuel leak was observed from the left tank where the aircraft has finally stopped. There was no fire. The cockpit in situ observations are, the Throttle position was in 'IN' position, Propeller control was in Full Increase RPM position and Mixture control was in Full Rich position (as shown in Picture 11). Flaps were in fully retracted position. (as shown in Picture 12). The measurements on the runway were following:

Start point of the impact-

1. RWY centre line to point of impact-3.5 feet
2. Runway edge to point of impact - 42 feet 5 inches

End point of the impact –

1. Runway Centre line to right main landing gear-14feet5 inches
2. Runway edge to left main landing gear-22 feet
3. Distance from the threshold of the RWY11 is 2000 feet

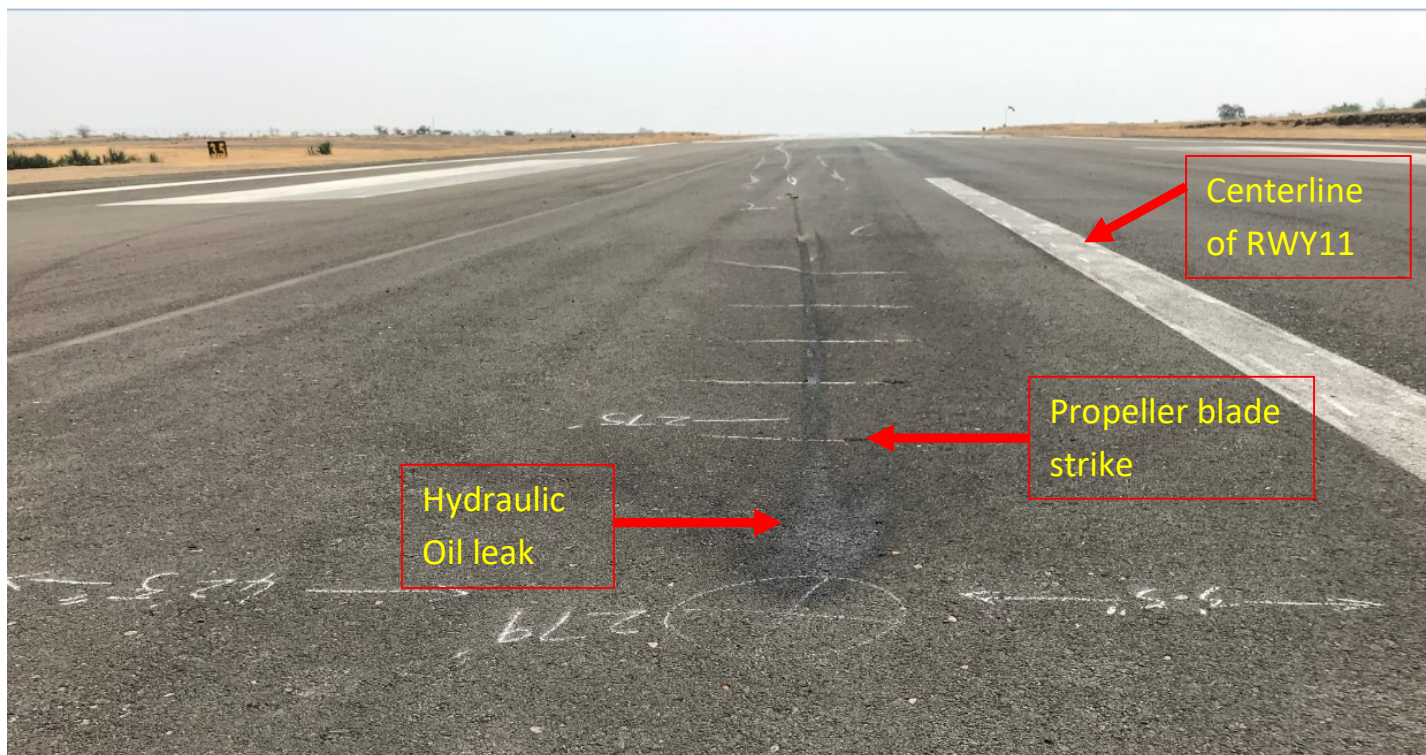


Picture 7 – Pictorial drawing

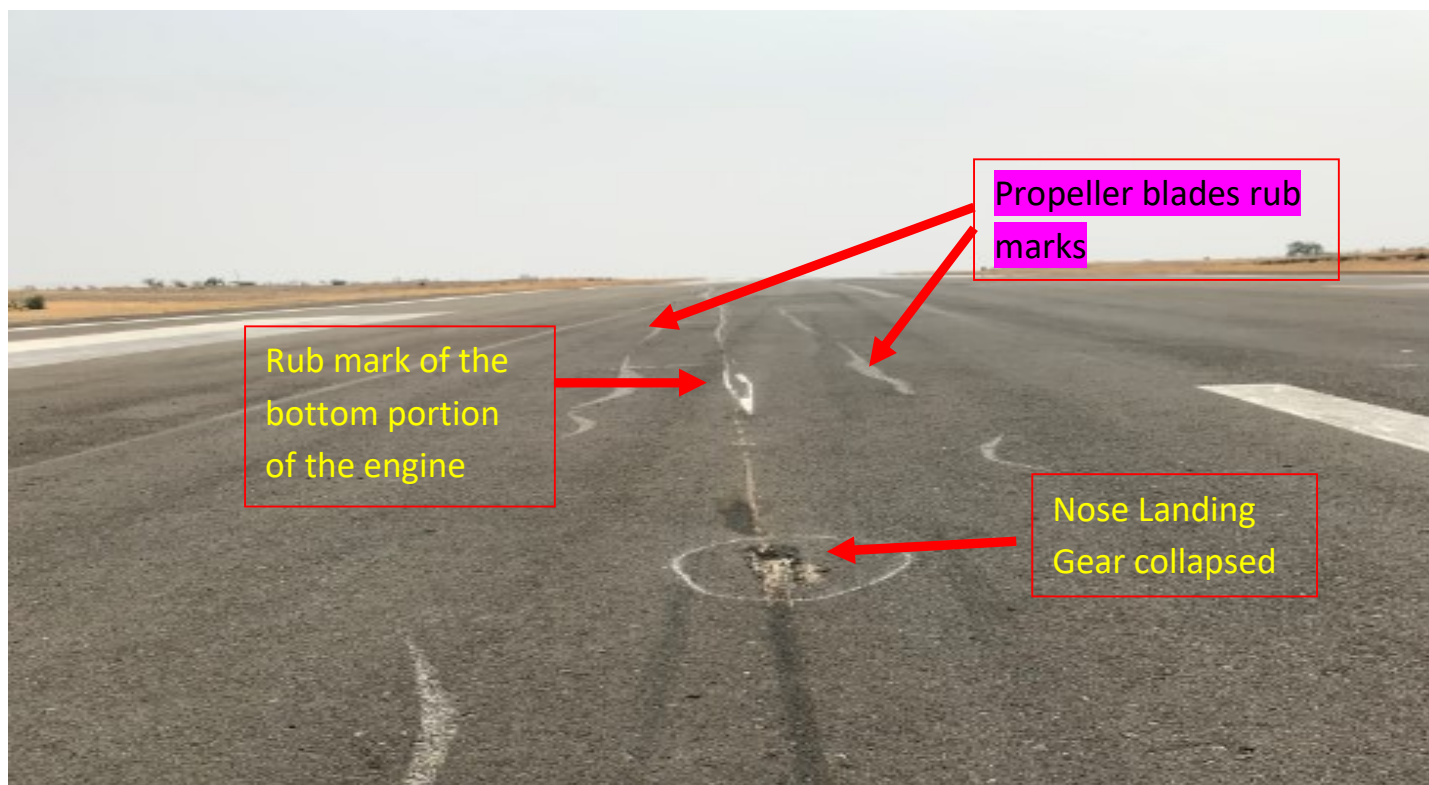
"A" – The distance from hydraulic oil leak on impact to the Nose Landing Gear collapse is 34feet.

"B" -- The distance from the Nose Landing Gear collapse to the aircraft stopped point is 245feet.

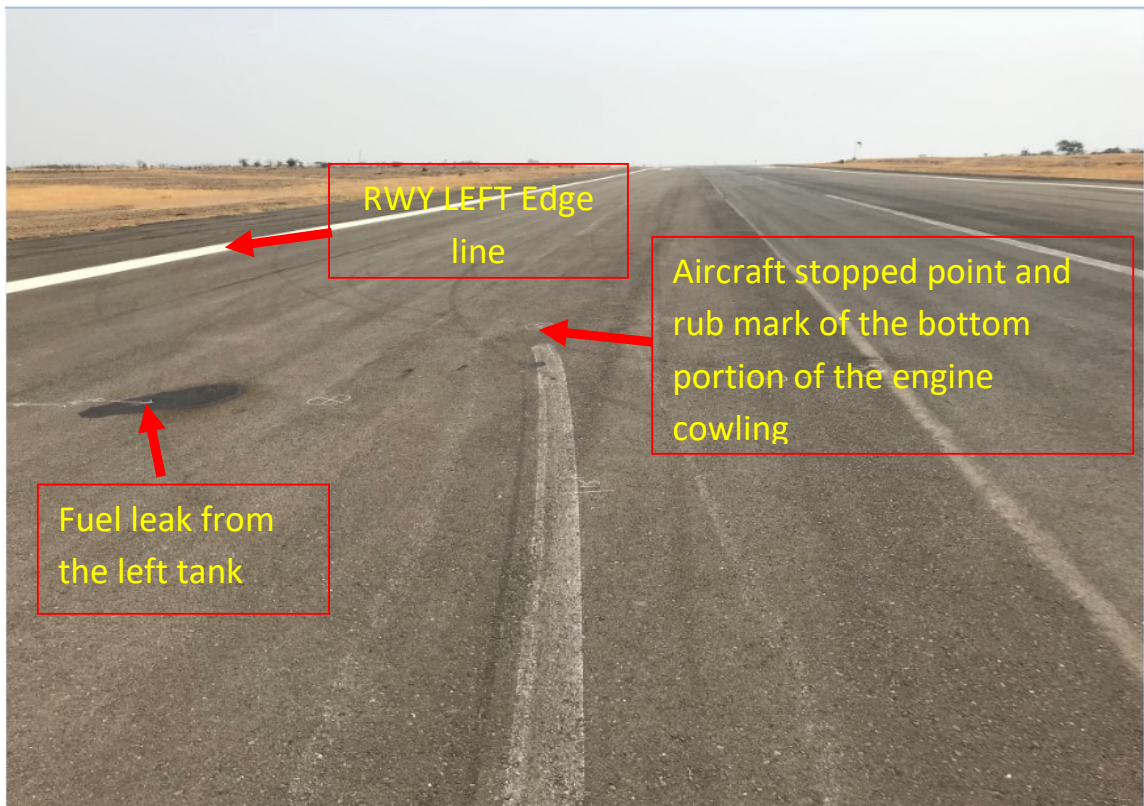
"C" -- Distance from the start of the impact to stoppage of aircraft is 279feet.



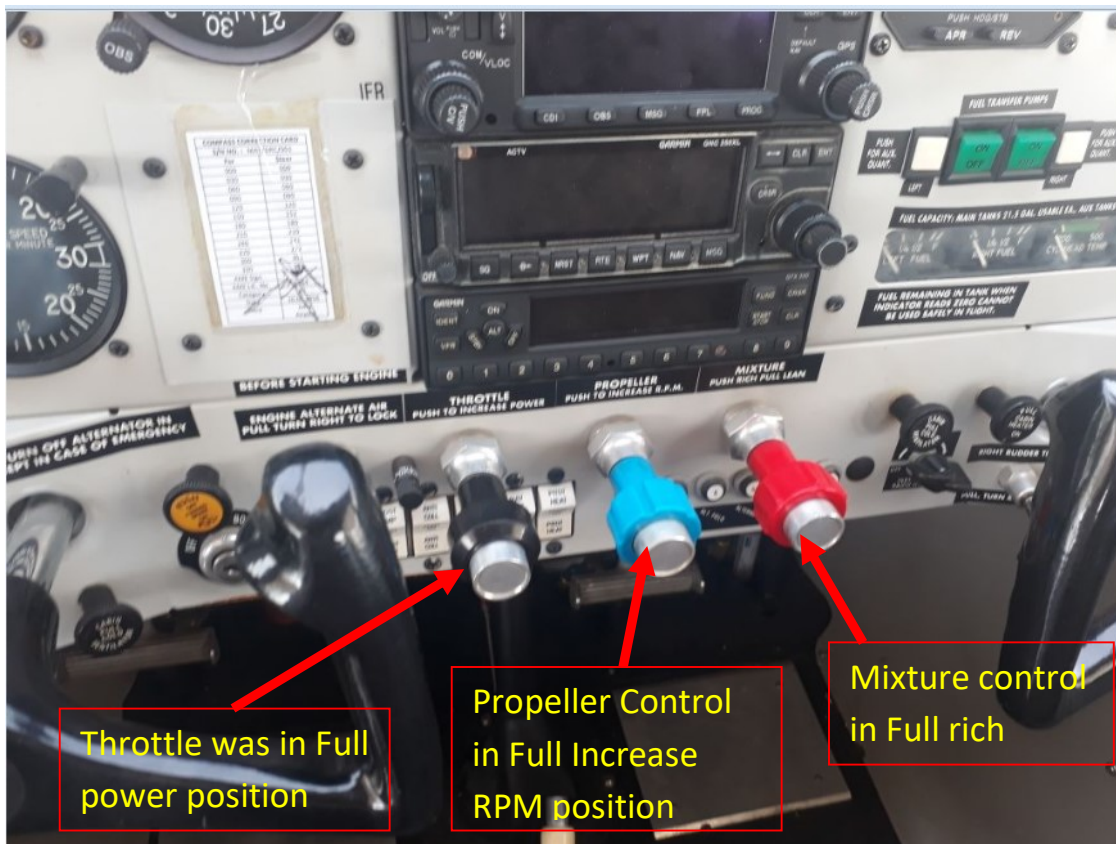
Picture 8 – Hydraulic Oil leak & Propeller blade strike



Picture 9 – Nose Landing Gear Collapse & rub marks on the runway



Picture 10 – Fuel leak from left tank and aircraft stopped point with rub mark



Picture 11 – Throttle, Propeller & Mixture control Position



Picture 12 - Flaps in Fully retracted position

1.13 Medical and pathological Information:

Pilot has not undergone Breath analyzer test before or after the flight on 12.03.2018.

1.14 Fire:

There was no fire.

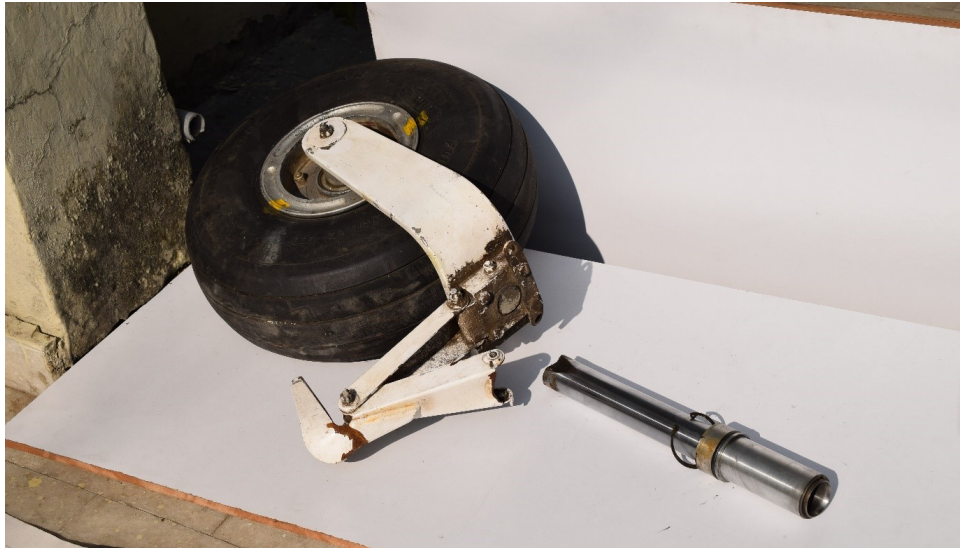
1.15 Survival aspects:

The incident was survivable.

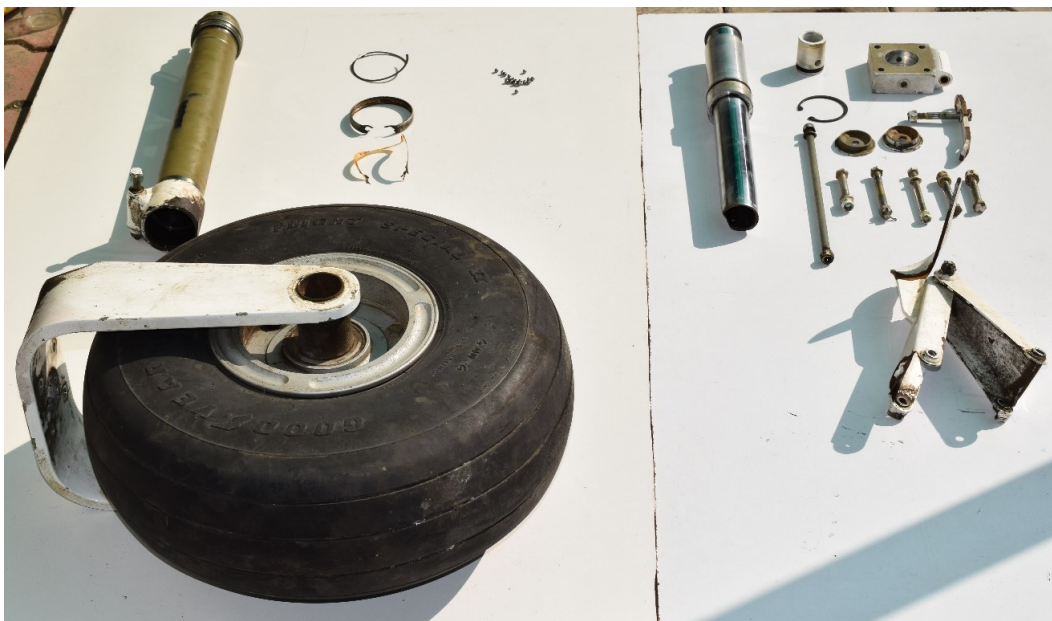
1.16 Tests and research:

Failed part of Nose Landing Gear of aircraft was sent to Aircraft Engineering Directorate, Technical Centre, DGCA for detailed examination. During detailed examination of the detached nose wheel which is shown in Photograph 13 and after

dismantling the nose wheel as shown in Photograph 14 (a), the broken part of the strut tube was removed from the assembly as shown in Photograph 14 (b). The fracture surface of the strut tube found slant and fibrous and the hole of the tube found to be oval shape (as shown in Photograph 14 (c)) which indicates that load exceeds the strength of part which may be caused due to impact or overload during landing.



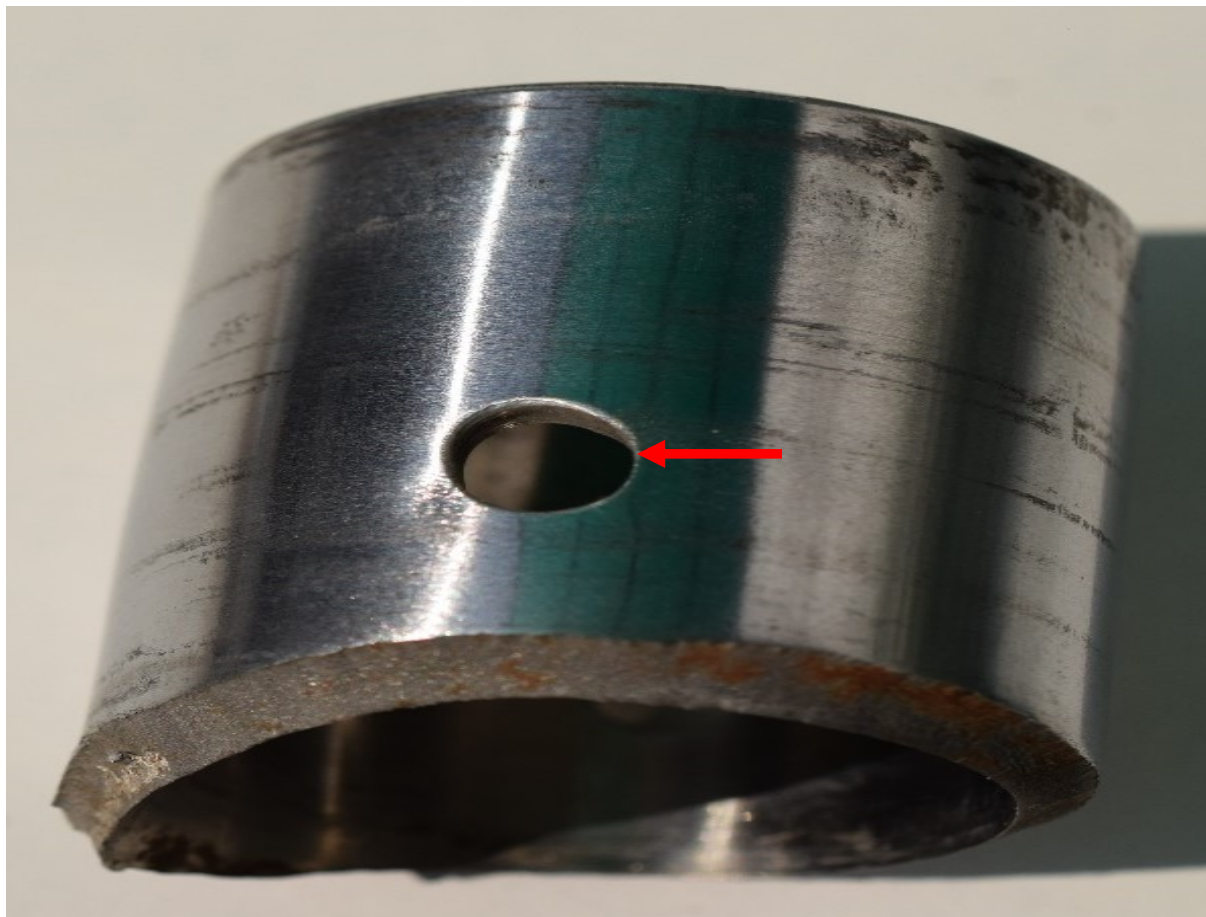
Photograph 13 - Detached nose wheel



Photograph 14 (a) - After dismantling



Photograph 14 (b) - the broken part of the strut tube



Photograph14 (c)-the strut tube found slant and fibrous and the hole of the tube found to be oval shape

1.17 Organizational and management information:

Open Skies Aviation Company was founded in year 2010 in Mumbai. The Aircraft was imported in July 2011. The certificate of Registration was issued by DGCA in November 2012 and the Certificate of Airworthiness was issued in November 2013. M/s Bombay flying club (approved by DGCA) carried out the recommended maintenance on the Maule MT-7-235 up till March 2018. The aircraft picked up was a second hand which had done 537hrs before its proving flight which was done by an American pilot for Certificate of Airworthiness purpose. The aircraft has flown total 567hrs since new. Since its import, the aircraft engine and the propeller has been overhauled once.

1.18 Additional information:

1.18.1 Information from Pilot statement/discussions:

As per the statement of pilot "They departed at 1714 hrs from RWY 26, Juhu. After take-off, the flight was normal cleared to 5500ft. In en-route he contacted Pune ATC and was changed over to Baramati at approx. 35nautical miles. He was advised to descend to 3000ft at 15 nautical miles and report at 5NM. He was advised to join left downwind to RWY 11 (Baramati) when runway in sight. He made a normal approach for RWY 11 and stabilized at approach speed of approx. 65kts. He carried out a normal flare and held up the nose with backward pressure. The altitude did not seem high for him. Then he observed the nose drop with landing gear collapsing and propellers striking and within 3 second the aircraft stopped on the nose. He switched off fuel, electrical (BATT, ALT) and ignition key & taken out. There was no fire, no injury to any PAX. His familiarization flight on this aircraft was carried out by Dy.CFI, M/s Bombay flying club Ltd. on 10th & 11th Mar 2018. He did not carry out Pre-flight medical check on 12.03.18 since he was flying under privileges of PPL. The Preflight inspection of aircraft on 12.03.18 was carried out by him as a privilege of his PPL".

As per the Flight Safety report filed by the Pilot:

"The aircraft was on a stabilized approach for runway 11, for Baramati. It touchdown on centerline in a three point attitude with a light bounce. The nose was kept up with backward pressure and then the nose collapsed and propeller touched the ground."

1.18.2 Information from ATC officer of M/s Carver Aviation statement/discussions:

As per statement of ATC officer "Aircraft VT-MAT was on a flight from Juhu to Baramati. The pilot contacted Baramati ATC on 129.25 at 35NM inbound Baramati maintaining altitude 5500 feet, he was advised to report when released by Pune ATC. Again the pilot contacted Baramati at 27NM and reported aircraft was released by Pune. The pilot was advised to descend 3000ft & report 5NM inbound to Baramati and when reported at 5NM aircraft was advised to report when RWY in sight. When aircraft was on final for RUNWAY 11, pilot was given instructions cleared to land on Runway 11 & given the wind checks as 'Winds Calm'. After landing on RWY 11 pilot reported "RUNWAY BLOCKED" at time approx. 1840 hrs. He has seen the aircraft in nose drop attitude on the runway".

1.18.3 Information from Dy. Chief Flying Instructor (Dy.CFI) of M/s Bombay Flying Club Ltd. statement/discussions:

As per the statement of Dy.CFI "He has conducted Familiarization flight for pilot on 10th & 11th of Mar 2018. On 10th March circuit flying was carried out with one landing and on 11th March Circuit & Landing was carried out with 4 touch & Go's (4 landings). Dy.CFI was the PIC on both the flights and had thoroughly briefed pilot on the operation of the aircraft under the privileges of his flight instructor rating, so the pilot could operate the airplane under the privileges of his open Rating. Dy.CFI has certified the pilot log book for the two familiarization flights". Further he added that "In general pre-flight inspection of aircraft is carried out by the PIC on the availability of CRS and other relevant documents from maintenance Organization. The pre-flight inspection authorization is given on the basis of pre-flight training carried out by the organization. The authorized person is authorized by the QM of their organization. Ideally the flaps for landing are at 50%, but for Baramati on longer Runway you could land at 0° flaps. Negative flaps are not desirable for landing".

1.18.4 Bouncing and Bounce Recovery (As per DGCA Operations Circular 09 of 2017)

Bouncing during a landing usually is the result of one or more of the following factors:

1. Excessive sink rate;
2. Late flare initiation;
3. Incorrect flare technique;
4. Excessive airspeed; and/or,
5. Power-on touchdown (preventing the automatic extension of ground spoilers, as applicable).

The bounce-recovery technique varies with each aircraft type and with the height reached during the bounce.

A. Recovery from a Light Bounce (Five Feet or Less)

When a light bounce occurs, a typical recovery technique can be applied:

1. Maintain or regain a normal landing pitch attitude (do not increase pitch attitude, because this could lead to a tail strike);
2. Continue the landing;
3. Use power as required to soften the second touchdown; and
4. be aware of the increased landing distance.

B. Recovery from a High Bounce (More Than Five Feet)

When a more severe bounce occurs, do not attempt to land, because the remaining runway may be insufficient for a safe landing. The following go-around technique can be applied:

- i. Maintain or establish a normal landing pitch attitude.
- ii. Initiate a go-around by activating the go-around levers/ switches and advancing the throttle levers to the go-around thrust position.
- iii. Maintain the landing flaps configuration or set a different flaps configuration, as required by the Aircraft Operating Manual (AOM)/quick reference handbook (QRH).
- iv. Be prepared for a second touchdown.
- v. Be alert to apply forward pressure on the control column and reset the pitch trim as the engines spool up (particularly with under wing-mounted engines);
- vi. When safely established in the go-around and when no risk remains of touchdown (steady positive rate of climb), follow normal go-around procedures; and,
- vii. Re-engage automation, as desired, to reduce workload.

1.18.5 Before Landing checklist (Extract from the Airplane Flight Manual):

E. BEFORE LANDING:

1. Seat Belts & Shoulder Harnesses.....FASTENED
2. Fuel Selector Valve.....ON FULLEST TANK OR BOTH
3. Mixture Control.....FULL RICH
4. Propeller Control.....FULL INCREASE RPM
5. Flaps.....AS REQUIRED
6. Alternate Air Control.....IN AND LOCKED

FAA APPROVED

DATE: 3/20/92

Rev. C dated: **OCT 28 1994**

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1.18.6 Normal Flight operations (Extract from the Airplane Flight Manual):

MAULE AEROSPACE TECHNOLOGY, INC.
AIRPLANE FLIGHT MANUAL
MAULE MT-7-235

SECTION III
NORMAL PROCEDURES

3.3 NORMAL FLIGHT OPERATIONS:

A. NOTE: FLAP SETTINGS:

The following Flap Settings are available:

Flap Configuration	Flap Handle Position	Flap Position
Cruise	Handle Full Down	-7°
Flaps Up	First Notch	0°
Takeoff	Second Notch	24°
Landing	Third Notch	40°

B. RECOMMENDED FLAP SETTINGS:

Flap settings are given in number of notches above the fully retracted position, which is handle full down (Normal -7°).

NOTE: The airplane meets CAR 3 takeoff climb requirements at 78K (90 mph) IAS with the flaps selected in any of the following three positions: (a) Fully Retracted, Handle full down (-7°), (b) First Notch (0°), and (c) Second Notch (24°).

Normal Takeoff - Second Notch (24°)

Normal Climb - First Notch (0°)

Best Angle of Climb - Second Notch (24°)

Cruise - Fully retracted (-7°/no notches or 0°/first notch)

Landing - Normally Third Notch (40°/full flaps) - other positions optional

C. CLIMBING:

Best Rate of Climb - 78K (90 mph) IAS, flaps @ First Notch (0°)

Best Angle of Climb - 65K (75 mph) IAS with flaps set @ Second Notch (24°)

//////////////////
////CAUTION//// FOR TAKEOFF OR LANDING UNDER GUSTY CROSSWIND
////////////////// CONDITIONS FLAP SETTING OF 0° (one notch) IS RECOMMENDED.
////////////////// -7° OPTIONAL.

//////////////////
////CAUTION//// USE CLIMB AIRSPEED BELOW 78K (90 MPH) ONLY AS NECESSARY
////////////////// AND CHECK CYLINDER HEAD TEMPERATURE FREQUENTLY WHEN
////////////////// DOING SO.

1.19 Useful or effective investigation techniques: NIL

2. ANALYSIS

2.1 Serviceability of the aircraft:

Maule MT-7-235 aircraft VT-MAT (MSN 18068C) was manufactured in the year 2004. On the day of incident, the aircraft VT-MAT had logged 567:36 airframe hours. Aircraft was holding a valid Certificate of Airworthiness and flight release prior to flight. The aircraft and Engine were being maintained under continuous maintenance as per maintenance program consisting of calendar period-based maintenance and flying Hours / Cycles based maintenance as per maintenance program approved by DGCA. Last maintenance check: 50 Hrs / 01-month inspection was carried out at 565:36Hrs on 16.02.2018 and the CRS (Certificate of Release to Service) was issued on the same date. There was no maintenance carried out on the nose wheel landing gear oleo strut in this check. The defect record of the aircraft was scrutinized for a period of one month from the date of occurrence of the incident and no defect was pending on the aircraft prior to the incident flight.

Pilot has carried out Pre-flight inspection of the aircraft before flying on 12.03.2018 (without obtaining any authorization from the quality manager of M/s Bombay Flying Club Ltd) and recorded all satisfactory in the checklist.

From the above it is inferred that the serviceability of the aircraft is not a factor to the incident.

2.2 Weather:

The METAR recorded on register at 1830 hrs on 12.03.2018 was winds 05 knots at 100°, visibility 6000 meters, temp 32 deg C and dew point 06° C, no significant clouds and QNH 1006 Hpa. Aircraft landed at 1838 hrs in calm wind and sky clear condition.

In view of the above, it is inferred that weather was not a contributory factor to the incident.

2.3 Examination of the failed part:

During detailed examination of the detached nose wheel, the fracture surface of the strut tube found slant and fibrous and the hole of the tube found to be oval shape,

which indicates that load exceeds the strength of part, which may be caused due to impact or overload during landing.

2.4 Pilot handling of the aircraft:

On 12/03/2018 the pilot calculated the Load & trim as per the OEM Pilots hand book for the sector Juhu-Baramati and the centre of gravity was found to be within limit. Pilot operated the flight for sector Juhu – Baramati as single pilot operation. Prior to this flight, on 10th & 11th March 2018, Pilot has undergone two familiarization flights as First Officer on aircraft Maule MT-7-235 for duration of 1 hour 10 minutes & 50 minutes respectively with the Dy.CFI of M/s Bombay Flying Club Ltd. On 12.03.2018, Pilot has flown the aircraft as PIC to Baramati. Pilot has never flown this aircraft (Maule MT-7-235) before 10.03.2018.

The aircraft took off at 1714 hrs from Juhu on 12/03/2018, the take off and en-route flight from Juhu to Baramati was uneventful. During in-bound Baramati the pilot took briefing from ATC Baramati for approach of RWY 11. Weather reported was calm with visibility of 6000 meters with clear skies and wind 100°/05KTs. The pilot flared the aircraft and held up the nose with backward pressure for landing, the aircraft touched down and bounced into the air. As the aircraft was in the air, as per the bounce recovery technique mentioned in para 1.18.4 “the normal pitch attitude as to be maintained or regained (to avoid the tail strike) and use the power required to soften the second touchdown” however it seems to be pilot had increased the pitch attitude and pushed the throttle lever in to full power position which led to the tail hook strike the RWY surface and when the aircraft touchdown RWY again with high impact on the nose landing gear resulted into the nose wheel oleo strut fracture. There was a hydraulic oil leak from the oleo strut on the RWY just before the nose wheel completely bogged down. Due to several strikes of propeller, all the three propeller blades bent inwards and got damaged. The aircraft finally stopped on the runway at approx. 2000 feet from threshold of RWY11.

During the post incident investigation, the flaps were found fully retract condition (Ref: Picture 12). This implies that the pilot has used 0° flaps during landing, which is recommended as per the Para 3.3 of Airplane Flight Manual (ref: 1.18.6) only under gusty crosswind conditions. However, the weather was calm as per the report. Further the movement of the flaps was checked for any stuck in position but found to be in satisfactory condition.

In view of the above, the pilot handling is considered as a factor to the incident.

3. CONCLUSIONS

3.1 Findings:

- a) The Certificate of Airworthiness and the Certificate of Registration of the aircraft was valid on the date of incident.
- b) The certificate of release to service (CRS) was valid on the day of incident.
- c) Last maintenance check: 50 Hrs/01-month inspections were carried out at 565:36 Hrs on 16.02.2018. There was no maintenance pertaining to the nose landing gear oleo strut in this check.
- d) There was no pending MEL or defect on the aircraft.
- e) Pilot has carried out Pre-flight inspection of the aircraft before operating the flight on 12.03.2018 without any authorisation and there were no abnormalities observed by Pilot before operating the flight.
- f) From the Pilot log book, it is observed that pilot did not fly the aeroplane from 21.03.2009 to 21.12.2017.
- g) On 22.12.2017, Pilot has undergone Ground refresher training and Familiarization flight on VT-PTJ (Cessna-152) at Falcon Aviation Academy, Faizabad for Private Pilot License (PPL) renewal.
- h) Pilot has undergone two Familiarization flights on VT-MAT (Maule MT-7-235) on 10th & 11th March 2018 for duration of 1 hour 10 minutes & 50 minutes respectively with Dy.CFI of M/s Bombay Flying Club. The third flight has flown i.e. incident flight on 12.03.2018 as PIC (Single pilot). Pilot has never flown this aircraft type (Maule MT-7-235) before 10.03.2018 however he has PPL license with open rating on all conventional airplanes having all up weight not exceeding 1500Kgs.
- i) Operator was not having approved Load & trim sheet from DGCA. Pilot has prepared the Load & Trim of the operating flight based on the OEM Pilot hand book procedures and the Centre of gravity was found within limit.
- j) The pilot's improper landing flare caused the aircraft land and bounce into the air. Further with the incorrect bounce recovery technique when the aircraft touchdown on runway again with high impact on the NLG resulted into the nose wheel oleo strut shear off from the lower attachment point of the torque link.
- k) It was found that all the three propeller blades were severely bent inward and damaged explicitly. The Nose landing gear oleo strut has sheared off from the base of the landing gear at the lower attachment point of torque link and Tail (mooring) has got rub mark on tail touchdown. Further the damage on the bottom portion of engine cowling damaged was observed.

- l) Weather was not a contributory factor to the incident.
- m) During the post incident investigation, the pilot has used 0° flaps during landing, which is recommended as per the Para 3.3 of Airplane Flight Manual (ref: 1.18.6) only under gusty crosswind conditions. However, the weather was calm at the time of landing as per the weather report available.
- n) Pilot has neither undergone Pre-flight Medical Examination (PFME) before operating the flight nor after the flight on 12.03.2018. As per Pilot “he did not carry out PFMC since he was flying under privileges of PPL”.
- o) Operator was not having Pre-Flight Medical examination facility and also does not have Operations Manual.
- p) The pilot has carried out the class II medical on 07.01.2017, (age of the pilot was 66 years 02 months). DGCA HQ’s Medical cell has given the validity of Medical Assessment for two years i.e. till 06.01.2019 vide file no. 1-691/1982-L-2 dated 30.01.2017 wherein it was to be given for one year as per The Aircraft Rules 1937 Part V 39C Sub rule 5(b) - Period of validity of medical fitness Assessment and Licences.
- q) The laboratory examination report of the failed part confirms that, the fracture of the NLG oleo strut may be caused due to impact or overload during landing.

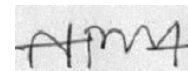
3.2 Probable Cause:

The incorrect flare and bounce recovery technique by the PIC was the probable cause of the incident.

4.0 Safety Recommendations:

1. DGCA may take appropriate action against the findings mentioned in Para 3.1 (i, j, n, o & p).

Date: 12.09.2019



(Preetham Reddy N)
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Investigator in-Charge.

GLOSSARY

ATC	Air Traffic Control
CRS	Certificate of Release to Service
DGCA	Directorate General of Civil Aviation
Dy.CFI	Deputy Chief Flying Instructor
FDTL	Flight Duty Time Limitation
FRTOL	Flight Radio Telephone Operator's Licence
FTL	Flight Time Limitation
IST	Indian Standard Time
MEL	Minimum Equipment List
NLG	Nose Landing Gear
OEM	Original Equipment Manufacturer
PFME	Pre-Flight Medical Examination
PIC	Pilot in-Command
PPL	Private Pilot License
RWY	Runway