GOVERNMENT OF INDIA

FINAL INVESTIGATION REPORT ON THE INCIDENT OF BELLY LANIDNG OF PIPER SENECA PA-34 AIRCRAFT VT-TAO OF M/s ALCHEMIST AVIATION PVT LTD AT JAMSHEDPUR ON 16.03.2022.

O/o Director General of Civil Aviation

Air Safety Directorate,

New Delhi - 110003

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FOREWORD

This document has been prepared based upon the evidences collected during the investigation and opinion obtained from the experts. The investigation has been carried out as per DGCA order issued under Rule 13(1) of the Aircraft (Investigation of Accidents and Incidents), Rules 2017; and format of the report is as per Annex-13 to the convention on International Civil Aviation Organization (ICAO).

The investigation is conducted not to apportion blame or to assess individual or collective responsibility. The sole objective is to draw lessons from this incident which may help to prevent occurrence of such incidents in future.

LIST OFABBREVIATIONS USED IN THE REPORT

ARC	Airworthiness Review Certificate
ARP	Aerodrome Reference Point
ATC	Air Traffic Control
BA	Breath Analyzer
CCTV	Close Circuit Television
CPL	Commercial Pilot Licence
CRS	Certificate of Release to Service
CVR	Cockpit Voice Recorder
DAS	Director of Air Safety
DFDR	Digital flight data recorder
DGCA	Directorate General of Civil Aviation
DME	Distance Measuring Equipment
DVOR	Doppler Very High Frequency Omni Range
Dy. CFI	Deputy Chief Flight Instructor
ER	Eastern Region
FDTL	Flight and Duty Time Limitation
FRB	Flight Report Book
hPa	Hacto pascal (unit of atmospheric pressure)
HZ	Haze
ICAO	International Civil Aviation Organisation.
IR	Instrument Rating
IST	Indian Standard Time
INS	inches
kg	Kilogram
KIAS	Indicated Air Speed in knots
kt	Knots
km	Kilo meter
m	Meter
NSC	No Significant Cloud
LH	Left hand
MHz	Mega hertz
PIC	Pilot-in-Command
RH	Right Hand
RT	Radio Telephony
RWY	Runway
SB	Service Bulletin
SCT	Scattered
SOP	Standard Operating Procedure
SPL	Student Pilot Licence
TWY	Taxiway
UTC	Coordinated Universal Time
VHF	Very High Frequency
100 LL	100 is octane value; LL is for low lead content.

FINAL INVESTIGATION REPORT ON THE INCIDENT OF BELLY LANDING OF PIPER SENECA PA34 AIRCRAFT VT-TAO OF M/s ALCHEMIST AVIATION PVT LTD AT JAMSHEDPUR ON 16.03.2022

1.	Aircraft	Type	Piper Seneca III PA-34-220T
		Nationality	Indian
		Registration	VT-TAO
2.	Owner/operator		M/s Alchemist Aviation Pvt Ltd
3.	Pilot-in-Command (Instructor)	License	CPL Holder
		Extent of Injuries	Nil
4.	Co-pilot (Student Pilot)	License	SPL Holder
		Extent of Injuries	Nil
5.	Passengers	Number	Nil
		Extent of Injuries	Nil
6.	Date & Time of Incident		16.03.2022 ; 15:04 IST approx.
7.	Place of incident		Jamshedpur Aerodrome
8.	Last point of departure		Jamshedpur Aerodrome
9.	Point of intended landing		Jamshedpur Aerodrome
10.	Type of operation		Flying Training
11.	Phase of operation		Landing
12.	Type of incident		Abnormal Runway Contact (ARC)

(All timings in the report are in IST unless or otherwise specified).

Synopsis:

M/s Alchemist Aviation Piper Seneca III PA-34-220T aircraft VT-TAO took off from Sonari Aerodrome, Jamshedpur, with an instructor and trainee on board on 16.03.2022 at 14:40 IST, for a training sortie. The instructor was to impart training to the trainee pilot about handling asymmetric thrust. The trainee pilot was at the controls during take-off and till the aircraft joined downwind leg. During downwind leg, the instructor took over the controls from trainee pilot. The instructor brought the throttle of right engine to idle position to simulate RH engine failure and began to demonstrate handling of asymmetric thrust. From the end of the downwind leg, the instructor made approach to short finals for runway 26 and made final approach for landing. The aircraft landed with its landing gear in retracted position and made abnormal runway contact (ARC) which resulted in the incident of belly landing of the aircraft.

The DGCA instituted an investigation into the facts and circumstances of the incident by appointing an investigator-in-charge vide order no DGCA-150189(17)/9/2022-DAS dated 24.03.2022 under Rule 13(1) of Aircraft (Investigation of Accident and Incidents) Rules 2017.The investigation revealed that the instructor did not carry out checklist for approach and landing. The incident was caused due to non-adherence of Approach and Landing SOP by the operating crew.

1. Factual Information

1.1. History of flight:

1.1.1. On 16.03.2022, M/s Alchemist Aviation aircraft VT-TAO flew two sorties before the incident. The first training sortie commenced at 10:55 IST and completed at 11:50 IST. The second sortie commenced at 12:20 IST and completed at 13:50 IST. Both the training sorties were uneventful.

1.1.2. A third sortie was planned in the afternoon. The trainee carried out pre-flight checks of the aircraft VT-TAO. The instructor briefed the trainee that two normal circuits would be carried out followed by handling of asymmetric thrust and landing familiarisation. Weather was not discussed in the briefing by the instructor. There was about 450 litres of fuel onboard. The aircraft took-off at 14:40 IST. The trainee was at the controls during the first circuit and the instructor was on RT. The instructor demonstrated the effect of asymmetric thrust and corrective action to be taken in case of one engine inoperative. Thereafter, the aircraft landed safely on runway 26 of Jamshedpur. There was no snag on the aircraft during the first circuit and landing.

1.1.3. After landing, the aircraft was lined up again on the runway 26 for second circuit. The trainee took-off the aircraft. During this circuit, while turning for downwind, a helicopter was heard calling repeatedly ATC Jamshedpur. The instructor also relayed the call of the helicopter to ATC Jamshedpur. The trainee was going to deploy flaps and landing gear down which was prevented by the instructor saying that he would demonstrate handling of asymmetric thrust.

1.1.4. The instructor took over controls, reduced throttle of the RH engine to idle and advanced throttle of LH engine and applied rudder for yaw correction. Then the instructor advised the trainee that they would delay deployment of flaps and landing gear till they felt that they could reach runway 26. Thereafter, the instructor skipped base leg and final leg while putting flaps 10 and 25 and approached runway 26 on short finals. While on short final approach, the instructor called ATC and

obtained clearance for ‘touch and go’. Thereafter the instructor put flaps at 40 and corrected approach for proper touchdown. The aircraft continued approach for landing.

1.1.5. M/s Alchemist Aviation was also maintaining an additional watch on VHF. The person maintaining VHF watch saw the aircraft on short finals and informed the flight crew that landing gear was not down. On hearing this, the instructor selected the landing gear lever to down position instantly. But by that time the aircraft had touched the runway surface. There was excessive noise on landing. The instructor immediately realised that the aircraft had made a belly landing. The aircraft landed on its belly on runway 26 and continued moving ahead with its belly rubbing on the runway surface. It came to stop on the LH edge of the runway, little ahead of TWY C.

1.1.6. After the aircraft came to stop, the instructor and the trainee came out of the aircraft unhurt. The incident of belly landing by VT-TAO occurred at 15:04 IST. Aerodrome ‘Firefighting and Rescue’ team reached the spot immediately. There was no fire after the belly landing. The runway was blocked due to this incident. Later, the aircraft was pushed manually and removed from the runway to clear it for operations. Thereafter, the runway was made available for operations.

1.2. Injuries to persons:

Injuries	Crew	Passengers	Others
Fatal	Nil	Nil	Nil
Serious	Nil	Nil	Nil
Minor/None	Nil/02	Nil	

1.3. Damage to the aircraft:

1.3.1. Nose Section: There were scratches on both nose landing gear doors and bottom skin.

1.3.2. Engine Section: The tips of the propeller blades of both engines were curled backwards. There was rubbing on cowl flap.

1.3.3. Wing Section: Both flaps were found defective and there was a dent on RH aileron.

1.3.4. Fuselage Section: Nose cone assembly, both spar cap, step assembly and adjoining areas were damaged.

Position of Aircraft VT-TAO on runway after belly landing incident.

1.4. Other damages:

Due to belly landing and propeller strike on the runway, rubbing marks, small dents or nicks were observed on runway surface.

Rubbing marks on runway due belly landing by VT-TAO at Jamshedpur

1.5. Personnel information:

1.5.1. Pilot- in-Command (Instructor):

Age	37 Years 3 Month / Male
Type of licence	CPL
Date of Issue	10.01.2008
Valid till	24.08.2023
Category	Aeroplane
Date of last Class 1 Medical Assessment	09.07.2021
Medical Exam validity	15.07.2022
FRTO Licence issued on	10.01.2008
FRTO Licence valid till	22.08.2023
Instrument Rating (date)	01.12.2021
Total Flying Experience	3155 Hrs 15 mins
Total Flying Hours as PIC	2998 Hrs 05 mins
Total Flying Hours as PIC on Type (Piper PA 34)	04 Hrs 45 mins
Total Flying Hours as Instructor on Type (Piper PA 34)	02 Hrs 20 mins
Total Flying Experience of Multi Engine Aircraft	24 Hrs 05 mins
Total flying experience in 01 year	358 Hrs 35 mins
Total flying experience in last 180 days	159 Hrs 50 mins
Total flying experience in last 30 days	48 Hrs 45 mins
Total flying experience in last 7 days	15 Hrs 20 mins
Total flying experience in last 24 hrs.	02 Hrs 55 mins
Duty Time last 24 hrs. (from time of incident)	08 Hrs 45 mins
Rest before duty	15 Hrs 45 mins

The pilot-in-command (Instructor) had undergone Pre-flight BA check at Sonari Airport on 16.03.2022 at 09:45 IST, which was negative.

1.5.2. Trainee :

Age	25 Years 6 Month / Male
Type of licence	SPL
Date of Issue	08.08.2018
Valid till	07.08.2023
Category	Aeroplane
Date of last Class 1 Medical Assessment	30.08.2021
Medical Exam validity	05.09.2022
FRTO Licence issued on	01.11.2018
FRTO Licence valid till	31.10.2028
Total Flying Experience	185 Hours

The trainee had submitted a BA self-declaration for pre-flight at 08:15 IST on 16.03.2022.

1.6. Aircraft information:

1.6.1. Aircraft Information:

AIRCRAFT:- VT-TAO		
Manufacturer		Piper Aircraft Corporation, Vero Beach, Florida, USA
Type		Piper Seneca III PA-34-220T
Owner	Address	Alchemist Aviation Private Limited, Sonari Aerodrome, Jamshedpur-831011, Jharkhand, India
	Nationality	Indian
Operator	Address	Alchemist Aviation Private Limited, Sonari Aerodrome, Jamshedpur-831011, Jharkhand, India
	Nationality	Indian
Manufacturer Serial no.		34-8333048
Year of Manufacture		1982
Certificate of Airworthiness		2324 dated 29.09.1997
Airworthiness Review Certificate		Reference: DAW/ER/ARC/2021/02 issued on 19.03.2021 and valid till 19.03.2022.
Category		Normal / Passenger
Certificate of Registration		Sl. No. 2907/3, Category-A
Minimum Crew Required		01
Maximum All Up weight		2159 kg
Last major inspection		100 hour inspection on 21.01.2022
Next major inspection due		300 hour inspection
Airframe Hrs since new		4729:45 hours
Status of Airworthiness Directive, Service Bulletins, DGCA Mandatory Modifications		Compliance of Piper SB1366 done on 24.06.2021.

1.6.2. Engine Information:

Engine:-	**LH**	**RH**
Manufacturer	Teledyne Continental	Teledyne Continental
Type	TSIO 360 KB	LTSIO 360 KB
Engine Serial no.	311408	807269
Time Since New	66 Hrs 45 Min	66 Hrs 45 Min

Certificate of Release to Service was issued on 15.03.2022. It was valid on the date of incident.

1.6.3. Centre of Gravity:

There were only 02 flight crew on board the aircraft. The aircraft was not over loaded and the centre of gravity was within limits.

1.6.4. Fuel:

The aeroplane VT-TAO was using aviation grade fuel 100 LL. There was approximately 420kg of fuel leftover on board after the belly landing of the aircraft at Jamshedpur.

1.6.5. Landing Gear Warning Horn:

1.6.5.1. The landing gear of VT-TAO (Piper Seneca III PA-34-220T) is energized and operated by 14 volt electrical system. Aircraft Maintenance Manual mentions that when the gear is down and locked, gear positions are indicated by three green lights, located to the left of the selector switch. A red light, incorporated in the enunciator panel at the top of the instrument panel, illuminates when the gear is unsafe. Activation of all three down lock switches will shut-off a hydraulic pump. During final approach, when the engine power is reduced by decreasing the throttle, the manifold pressure drops below approximately 14 inches of mercury. If the landing gear has not been extended, a throttle switch located in the quadrant will actuate a warning horn indicating to the pilot that the landing gear is still up. The warning horn will continue to operate until the landing gear is down and locked, after which the three green lights will be energized on the instrument panel. On Seneca III airplanes, the green lights will dim when the navigation lights are turned ON.

1.6.5.2. Pilot Operating Handbook section 4.41 for the aircraft also mentions the following:

"Sometime during the approach for a landing, the throttle controls should be retarded to check the gear warning horn. Flying the airplane with the horn inoperative is not advisable. Doing so can lead to a gear up landing as it is easy to forget the landing gear, especially when approaching for a single engine landing, or when other equipment is inoperative, or when attention is drawn to events outside the cabin. The red landing gear unsafe light will illuminate when the landing gear is in transition between the full up position and the down and locked position. Additionally, the light will illuminate when the gear warning horn sounds. The gear warning horn will sound at low throttle settings if the gear is not down and locked."

1.7. Meteorological information:

1.7.1. Meteorological Information at Sonari Aerodrome at 09:00 UTC (14:30 IST)

Wind: 230/04 KT	Visibility: 5000 Metres	Weather: HZ
Cloud 1: NSC		Cloud 2:
Cloud 3:		Cloud 4:
Temperature: 38º C		QNH : 1003 hPa 29.63 INS
Dew Point: 09º C		QFE : 0986 hPa 29.12 INS
Trend :---		

1.7.2. Meteorological Information at Sonari Aerodrome at 09:40 UTC (15:10 IST)

Wind: 230/02 KT	Visibility: 5000 Metres	Weather: HZ
Cloud 1: NSC		Cloud 2:
Cloud 3:		Cloud 4:
Temperature: 37º C		QNH : 1003 hPa 29.62 INS
Dew Point: 09º C		QFE : 0985 hPa 29.09 INS
Trend: ---		

1.8. Aids to Navigation:

1.8.1. Sonari aerodrome is equipped with navigational aids like DVOR and DME. All ground aids to navigation were serviceable. Navigation equipment on-board the aircraft were also serviceable.

1.9. Communication:

1.9.1. The aeroplane was equipped with VHF communication equipment. ATC Jamshedpur was also equipped with VHF communication facility. Two way VHF radio communications was available between ATC Jamshedpur and the aeroplane throughout its flight. VT-TAO was also in contact with 'local watch' of M/s Alchemist Aviation.

1.9.2. Before landing, VT-TAO got a call on the RT from 'local watch' regarding landing gear not down. However as per statements of the flight crew, it was too late to react and the aeroplane landed on its belly with landing gear in retracted position. It was an abnormal surface contact with the runway.

1.10. Aerodrome information:

Jamshedpur Aerodrome (ICAO Code - VEJS) is located at Sonari, Jamshedpur in East Singhbhum District of Jharkhand and is about 11.9 km North West of Tatanagar Railway Station. The aerodrome is owned, operated and maintained by M/s Tata Steel since 1940 and is spread over 104.37 acres. Jamshedpur aerodrome runway ends are 26 and 08.The ARP co-ordinates are 22º 48' 52" N &086º 10' 08" E. Runway length is 1030 meter and width is 30meter. There are two taxiways, TXY B and TXY C, both on the left side of RWY 026. TXY B directly leads to the apron in front of M/s Alchemist Aviation office and hangar. Runway surface is made of asphalt. Night landing facility is also available in Sonari Aerodrome.

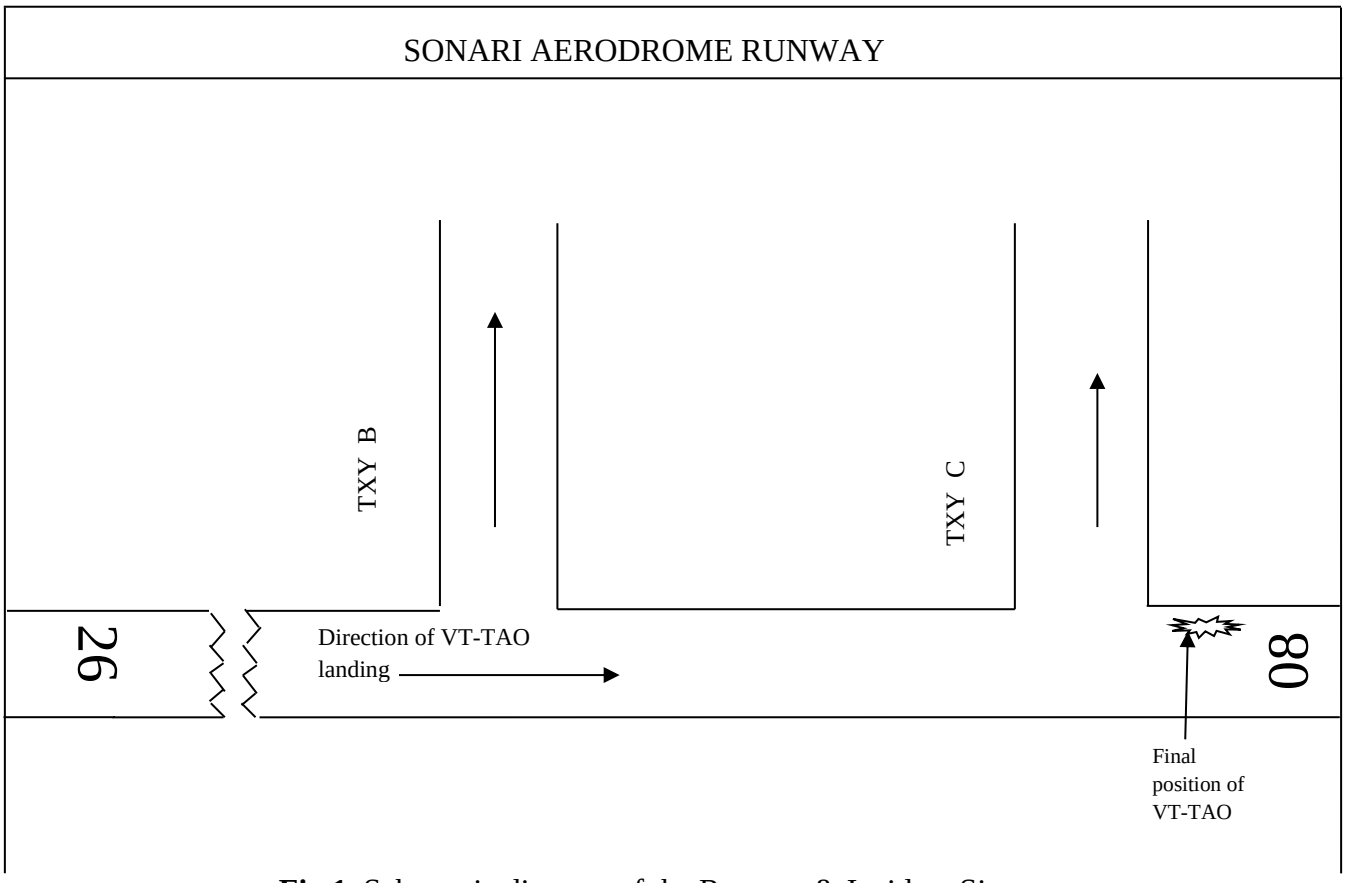

Fig 1. Schematic diagram of the Runway & Incident Site

1.11. Flight recorders:

1.11.1. CVR: The aeroplane is not equipped with Cockpit Voice Recorder (CVR).

1.11.2. DFDR: The aeroplane is not equipped with Digital Flight Data Recorder (DFDR).

1.12. Wreckage and impact information:

The aircraft landed on its belly on the runway. However, there was no wreckage.

1.13. Medical and pathological information:

After the bellylanding incident, both the flight crew underwent a medical examination by DGCA approved Class II medical examiner. There was no injury to them. The instructor underwent a post incident BA check at 15:56 IST on 16.03.2022, which was negative. Trainee pilot also underwent a post incident BA check which was negative.

1.14. Fire:

There was no fire or smoke during or after the incident.

1.15. Survival aspects:

The incident was survivable.

1.16. Tests and research:

1.16.1. Information from the extension and retraction check of the landing gear:

The aircraft was brought to hangar and put on jacks for extension and retraction check of landing gear. The landing gear extension and retraction check was done three times. During the checks, no abnormalities in the extension or retraction of the landing gears were observed. The three green lights in cockpit for landing gear illuminated every time the landing gear was down and locked. The opening and closing of the nose wheel door and the main wheel doors were also seen to be smooth. The doors opened and closed without any impediment (hesitation) in operation. The landing gear extension and retraction check for VT-TAO was witnessed by an officer of DAS (ER).

1.16.2. Information from Landing Gear Horn Check:

When the landing gear was in retracted position and uplocked and throttle was retarded to a low setting, the 'warning horn' began to sound. After this, the landing gear was extended and the throttle was retarded to low setting; at this the 'warning horn' did not sound which was correct. This test was repeated and it was observed that the landing gear 'warning horn' was serviceable and working normal. The landing gear 'warning horn' check for VT-TAO was witnessed by an officer of DAS (ER).

1.17. Organizational& Management information:

The owner and operator of the aeroplane VT-TAO is M/s Alchemist Aviation Limited. It is a Flying Training Organization. Registered address of the operator is:

Sonari Aerodrome, Jamshedpur-831001, Jharkhand, India.

The operator has six aeroplane in its fleet including one multiengine aeroplane and five single engine aeroplane. The Accountable Manager, Dy Chief Flight Instructor, Quality Manager and Continuous Airworthiness Manager look after the day to day functioning of the organization.

1.18. Additional information:

1.18.1. Information from Footage of CCTV installed at ATC:

From the CCTV footage of ATC Tower at Sonari Aerodrome, it is seen that the aircraft VT-TAO landed on its belly at 15:04:47 IST on RWY 26. The fire tender truck is seen approaching RWY 26 at 15:05:50 IST and an ambulance closely followed it at 15:06:04 IST. The field of view of this CCTV camera was a portion of RWY 26 with TXY C at the extreme right, and VT-TAO was not visible after moving out of CCTV field of view. Thereafter at 15:10:09, the CCTV camera was panned towards the resting location of VT-TAO. VT-TAO was seen lying on the runway on its belly. The fire tender and ambulance were seen standing about 60 feet behind VT-TAO on the runway. The aircraft is seen being cordoned off with a ribbon at about 15:11:00 IST. Another ambulance is seen coming close to VT-TAO at 15:16:31 IST. An attempt to remove the aircraft VT-TAO from the runway is seen being made at 15:27:19 IST. The process of manual removal of VT-TAO by numerous personnel on ground is seen starting at 15:31:16 IST. The removal of the

disabled aircraft from the active runway to the adjacent basic strip ends by 15:39:00 IST. After the dispersal of personnel and fire truck from the runway, the cleaning process of the runway started at 15:44:47 IST and visual inspection of the runway is seen being carried out at about 15:58:00 IST.

1.18.2. Information from statement of Flight Crew:

Both the instructor and the trainee of the incident flight had given their written statements on the day after the incident. Thereafter they were also called to O/o DGCA ER for investigation. Both submitted their response to a questionnaire. A supplementary statement was also submitted by the trainee pilot. The following information is gathered from their written statements and questionnaires.

1.18.2.1. Information from Statement of the trainee:

A sortie was planned from 14:40 IST on 16.03.2022. The instructor briefed the trainee that they would carry out two normal circuits followed by asymmetric handling and landing familiarization. No weather briefing was conducted by the instructor. The trainee carried out pre-flight inspection of VT-TAO before the sortie. There was about 450 litres of fuel onboard. There was no snag in the aircraft. The aircraft took-off at about 14:40 IST. The trainee was at the controls during the first circuit and the instructor was on RT. The aircraft landed safely and then backtracked for line up for second circuit. The aircraft took off with the trainee at controls. During downwind leg of the second circuit, the instructor made a relay for a helicopter. At this leg, the trainee was about to deploy flaps and landing gear down which was stopped by the instructor by saying that he would demonstrate handling of asymmetric thrust. The instructor took over controls, reduced throttle to idle on right engine and advanced throttle on left engine and then applied rudder for yaw correction. The instructor advised that they would delay deployment of flaps and landing gear till they felt that they could reach runway 26. The instructor skipped base leg and final leg, put flaps to 10^{o} followed by 25^{o} and approached RWY 26 on short finals. The instructor obtained clearance from ATC for touch and go, put flaps at 40^{o} and then corrected approach to make proper touchdown. No checklist was carried out during approach or before landing. Even the three green lights of the landing gear were not checked before landing which resulted in belly landing. Trainee also submitted in his supplementary statement that he did not hear any warning horn in the aircraft during the belly landing of VT-TAO.

1.18.2.2. Information from Statement of the Instructor:

The pre-flight inspection of VT-TAO was carried out for the afternoon sortie at about 14:30 IST. The trainee was at the controls during the first sortie with the assistance and supervision of the instructor. ATC services were not available during first take-off and the aircraft was operating beyond watch hours. There was no input from ATC regarding weather. After first take-off, when a helicopter VT-TSJ was giving call repeatedly to ATC Jamshedpur, the instructor relayed a message to the ATC for the helicopter. The instructor mentioned that checklist was not followed during flight phases. The trainee took-off the aircraft for second circuit and in this circuit they had planned to carry out demonstration of asymmetric handling of thrust and landing. The instructor initiated demonstration of asymmetric handling of thrust by bringing throttle of right engine to idle position. The instructor then advised that due one engine inoperative, they would use flaps on final when sure of reaching runway but apply landing gear here only. Trainee replied in affirmative which the instructor took as sign of acknowledgement of 'lowering landing gear'. Instructor then continued demonstration with a turn to base and on short finals gave call to ATC for final on RWY 26 for touch and go. On reaching flare height, they rounded off, reduced throttle to idle and as aircraft was sinking, call came on RT "no landing gear". Thereafter, the instructor immediately operated landing gear lever to down position and put hand on throttle to open power for go around. But by that time, the aircraft had already touched the runway surface without landing gear extended. Instructor had also submitted that no warning horn was heard by him during the belly landing. He did not check the landing gear warning horn on approach and did not check for three green lights of landing gears in cockpit before landing. Check list for 'approach and landing' was not carried out by the instructor before belly landing incident. He did not make any entry in Flight Report Book (FRB) of the aircraft about unserviceability or defect of the landing gear horn.

1.18.3. Normal Procedure (Checklist) for Approach and Landing (PA-34-220T)

Gear warning horn .....check
Seat backs .....erect
Belts/harness .....fasten/adjust
Fuel selectors.....ON
Cowl flaps.....as required
Auxiliary fuel pumps .....OFF
Mixture controls.....rich
Prop controls .....FULL FORWARD
Landing gear .....DOWN, 130 KIAS max.
Flaps .....set, 115 KIAS max.
Approach speed.....90 KIAS or above

1.19. Useful or effective investigation techniques:

Nil.

2. Analysis:-

2.1. Serviceability of the Aircraft:

The 'Certificate of Airworthiness' and 'Airworthiness Review Certificate' of the aircraft VT-TAO were valid on the date of the incident. The 'Certificate of Release to Service' (CRS) was valid on the date of incident. There was no snag on the aircraft. The last major maintenance of the aircraft was carried out on 21.06.2021. The aircraft was not due for any major maintenance. However as per the statements of both the instructor and the trainee of the incident flight, they did not hear any warning horn or buzzer/sound when the aircraft was on final approach for landing. But the instructor did not make any entry in the Flight Report Book (FRB) after the incident that the 'gear warning horn' was unserviceable. Extension and retraction check of landing gear was performed after the incident to confirm whether its operation was impeded. The landing gear extension and retraction check was found to be satisfactory. Therefore, it was never the case that the landing gear did not extend after the landing gear selector lever was selected 'down' by the flight crew. Similarly, landing gear 'warning horn' was also checked after the incident and found to be working normal. Therefore, there was no snag pertaining to the landing gear and 'landing gear warning horn'. Thus, maintenance or serviceability of the aircraft was not a contributory factor to the incident.

2.2. Weather:

Met report was obtained from ATC Jamshedpur for the time period of the incident. The weather was haze with a visibility of 5 km. The wind speed was varying between 2 – 4 knots and temperature varied from 37 to 38 degrees Celsius. There was no rain or precipitation and the runway was dry. Though the temperature was on higher side, the weathers conditions were fine and suitable for flying training at Jamshedpur aerodrome. Thus, weather was not a contributory factor to the incident.

2.3. Pilot handling of the aircraft:

The instructor was Dy. CFI at M/s Alchemist Aviation Pvt Ltd and had 3155 hours 15 minutes of total flying hours experience out of which 2998 hours 05 minutes were as PIC. However on multi-engine aircraft, Dy. CFI had about 24 hours 05 minutes of flying experience out of which 4 hours 45 minutes were as PIC. He started his role as instructor on multi-engine aircraft VT-TAO on

16.03.2022 and carried out two successful training sessions that day logging 2 hours 20 minutes, before the occurrence of the incident on the same day. During the incident sortie, the instructor was busy explaining asymmetric thrust handling to the trainee. The instructor took over the control from the trainee at this stage and began to explain the handling of asymmetric thrust. He advised the trainee that flaps and lowering of landing gears should be delayed till it was felt that the aircraft would be able to reach the runway. Further, the Instructor was required to check the landing gear horn during approach but he did not check. He did not carry out the approach and landing checklist before landing. This was a non-adherence to Standard Operating Procedure. Approach and Landing checklist contained 'Gear warning horn' and 'landing gear' among the items for check during approach. However, this checklist was not carried out by the instructor to ensure that 'warning horn' was functioning and landing gear was down before landing. Further, the Pilot Operating Hand Book section 4.41 already mentioned that gear up landing was a possibility when landing with single engine or with any other equipment inoperative or when attention was drawn outside the cabin; and therefore required the 'gear warning horn' to be checked by retarding the throttle. The flight crew did not check the 'gear warning horn' which was part of the approach and landing checklist. Thus, the flight crew did not carry out the 'Approach and landing' checklist to ensure that the landing gear was extended before landing; which was the cause of the incident.

2.4. Circumstances leading to the incident:

The instructor was explaining handling of asymmetric thrust to the trainee during the incident sortie. The controls of the aircraft were with the instructor right from the time the aircraft was in downwind phase of flight. The instructor did not carry out the approach and landing checklist. The landing gear 'warning horn' was working normal when checked on ground post incident but it was not checked by the instructor during approach. Further, he did not check whether the landing gears were down and locked and three green lights were illuminated before landing. As the approach and landing checklist was not carried out by the instructor, and also he did not ensure that landing gears were down and locked before landing, the aircraft landed with landing gear in retracted position; which resulted in belly landing. Non-adherence to SOP in the form of normal checklist for 'approach and landing' was the cause of the incident. The instructor and the trainee mentioned that they did not hear any warning horn. When the landing gear is retracted up during approach, the landing gear warning horn will sound subject to retarded position of throttle as per checklist. If the landing gear warning horn was not heard, it might be due to incorrect position of the throttle during approach or the warning horn was not checked at all. The instructor was required to check the warning horn

during approach with the help of check list but he did not check the warning horn. Therefore, their version does not appear to be correct.

3. Conclusion:

3.1. Findings:

3.1.1. The aeroplane VT-TAO was issued with Certificate of Airworthiness and had a valid Airworthiness Review Certificate. There was no snag in the aircraft before departure of the incident flight.

3.1.2. The licenses and other credentials of the instructor and the trainee were valid on the date of incident. The instructor had undergone BA check in the morning of 16.03.2022. The result of BA check was negative. The trainee had submitted his declaration in lieu of BA check.

3.1.3. The instructor had a total flying experience of 3155 hours 15 minutes out of which 2998 hours 05 minutes were as PIC. His total flying hours on multi-engine aircraft were 24 hrs 05 minutes; out of which 4 hours 45 minutes were as PIC. Of the 4 hours 45 minutes as PIC, 2 hours and 20 minutes were as instructor on PA-34-220T.

3.1.4. The instructor and trainee had sufficient rest before flying on the day of incident i.e. 16.03.2022.

3.1.5. The weather was fine and was not a contributory factor to the incident.

3.1.6. The instructor was demonstrating handling of asymmetric thrust and simulating single engine landing to the trainee during the incident sortie.

3.1.7. The instructor did not check the landing gear warning horn before final approach for landing, as required by the normal 'approach and landing' checklist.

3.1.8. The controls of the flight were with the instructor from downwind phase onwards till landing of the aircraft. The instructor made the final approach for landing with landing gears in retracted position.

3.1.9. The instructor did not carry out the approach and landing checklist before final approach for landing and did not ensure that the landing gear was extended before landing.

3.1.10. The instructor continued the final approach for landing with the landing gear in retracted position. This resulted in the belly landing of the aircraft VT-TAO. Non-adherence to SOP (checklist for approach and landing) by the instructor was the cause of the incident.

3.1.11. After belly landing, the aircraft VT-TAO continued to slide on its belly on the runway and stopped little ahead of TXY C. The aircraft stopped on the runway and became disabled. It was then removed from the runway manually to clear the runway for operations.

3.1.12. Although the instructor mentioned that he did not hear any warning horn but he did not make any entry in FRB of the aircraft VT-TAO post incident about defect in landing gear 'warning horn'.

3.1.13. The landing gear extension and retraction check was carried out post incident to check if there was any defect in the operation of landing gears. The landing gears were found extending and retracting normal without any hesitation.

3.1.14. The landing gear warning horn was checked after the incident. It was found working normal and serviceable.

3.2. Probable cause of the incident:

The incident was caused due to non- adherence of Approach and Landing SOP by the operating crew.

4. Safety Recommendations:

4.1. The competent authority may take corrective action as deemed fit in view of the findings and probable cause of the incident.

(H.N Mishra)
Director Air Safety
(Investigator in-Charge)

Place: Kolkata
Date: 28.10.2023

Appendix - Photograph

Aircraft VT-TAO removed and shifted away from runway at Sonari Aerodrome after the incident.