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DIRECTORATE GENERAL OF CIVIL AVIATION

**INVESTIGATION REPORT ON INCIDENT TO M/s HERITAGE
AVIATION PVT. LTD. EC-130T2 HELICOPTER VT-HEX DURING
FLYING FROM PANCHTARNI TO PAHALGAM ON 03.07.2022**

**GOVERNMENT OF INDIA, O/o DIRECTOR GENERAL OF CIVILAVIATION,
OPP. SAFDARJUNG AIRPORT, NEW DELHI-110003**

INVESTIGATION REPORT ON INCIDENT TO M/s HERITAGE AVIATION PVT. LTD. EC-130T2 HELICOPTER VT-HEX DURING FLYING FROM PANCHTARNI TO PAHALGAM ON 03.07.2022

1	Aircraft	Type	EC-130T2
		Nationality	Indian
		Registration	VT-HEX
2	Owner	M/s Quantum Investment Ltd M/s Heritage Aviation Pvt. Ltd.	
	Operator		
3	Pilot – in –Command	Commercial Pilot License (Helicopter)	
	Extent of injuries	Nil	
4	Date & Time of Incident	03.07.2022 at 1750 hrs IST Approx	
5	Place of Incident	Enroute	
6	Co-ordinates of Incident site	Near Mahaguna Pass	
7	Last point of Departure	Panchtarni Helipad, Sri Amarnath	
8	Intended place of landing	Pahalgam Helipad	
9	No. of Passengers on board	Five (05)	
10	Type of Operation	Commercial (Pilgrim operation)	
11	Phase of Operation	Climb	
12	Type of Incident	Engine parameter exceedance during flight	

(All timings in the report are in IST or else specifically mentioned)

SYNOPSIS:

On 03.07.2022 M/s Heritage Aviation Pvt. Ltd. EC130-T2 helicopter was engaged in pilgrim operation from Pahalgam- Panchtarni- Pahalgam. Helicopter took off from Panchtarni (Sri Amarnath) with 05 passengers for Pahalgam. During climb to cross the Mahaguna Pass, crew felt downdraft and helicopter started sinking. PIC raised the collective control to come out of the downdraft however helicopter kept sinking. Crew looked for a suitable field for landing and saw a relatively flat surface which was ahead as the helicopter was experiencing sink. PIC raised the collective to full and entered into flattish surface and started moving ahead, he could not make right turn and instead made a left turn and came out of the flat area. During this process engine parameters exceeded for a brief period. Subsequently the helicopter climbed to 14000ft and thereafter the flight was uneventful and helicopter landed safely at Pahalgam helipad.

Director General of Civil Aviation instituted the investigation by appointing Investigator-in-Charge under Rule 13(1) of The Aircraft (Investigation of Accidents and Incidents) Rules 2017.

During investigation it was found that; the engine parameters exceedance was caused due to improper handling of flight controls by the PIC during sudden change in environmental conditions (downdraft).

Crew's poor situational awareness for not maintaining a safe height of the helicopter while flying in the valley, is a contributory factor to the incident.

1. FACTUAL INFORMATION:

1.1. History of Flight:

On 03.07.2022 M/s Heritage Aviation Pvt. Ltd. EC130-T2 helicopter was engaged in pilgrim operation from Pahalgam- Panchtarni- Pahalgam. A total of 32 landings were carried out since morning at Pahalgam and Panchtarni and all the flights were uneventful. During the last sortie, helicopter took off from Pahalgam at about 1730hrs IST with five passengers for Panchtarni, an uneventful landing was carried out at Panchtarni and passengers were offloaded at Panchtarni. Again 05 passengers were boarded at Panchtarni for landing at Pahalgam. Helicopter took off from Panchtarni helipad and started climbing for crossing Mahaguna pass. As per crew's statement close to Poshpathri, he felt a strong downdraft and the helicopter started sinking from its level of 13000 ft. Crew reduced the speed and raised the collective to counter the situation, however the helicopter kept sinking. PIC looked for a suitable field for landing and saw a relatively flat surface in front of him which was ahead as the helicopter was sinking. PIC raised the collective to full and entered into that flattish surface and started moving ahead. PIC could not make a right turn and made a left turn to come out of the area. Subsequently helicopter was accelerated and climbed to 14000 ft. Thereafter, the flight was uneventful and helicopter landed safely at Pahalgam helipad.

During the process of negotiating with the environment condition (downdraft), Engine N1 (Engine Generator Speed) and TOT (Turbine Outlet Temperature) exceeded for a brief period while Nr (Rotor Speed) decreased below safe limits, and associated warnings were recorded. The N1 reached up to 102.7%, TOT reached up to 986°C and Nr decreased to 88%. The N1 Exceedance was recorded for a period of 65 seconds, TOT exceedance was recorded for 58 seconds and Nr drop was recorded for 23 seconds. The exceedances were recorded in VEMD (Vehicle and Engine Multifunction Display) and EDR (Engine Data Record).

After landing at Pahalgam, passengers were offloaded and without switching off the engine, crew continued shuttle flying operation for another 02 more landings with passengers onboard the helicopter. Finally when helicopter was switched off at Pahalgam helipad for refueling, crew noticed the message "OVER LIMIT DETECTED"

and same was reported to engineering personnel. Certified Engineer verified the exceedance of N1, TOT and Nr from VEMD, and grounded the helicopter for maintenance actions. The last two sorties were carried out in possible degraded condition due to exceedance of engine parameters.

1.2. Injuries to Persons:

Injuries	Crew	Passengers	Others
Fatal	NIL	NIL	NIL
Serious	NIL	NIL	NIL
Minor/None	NIL/1	NIL/5	

1.3. Damage to Aircraft: Nil

1.4. Other Damages: Nil

1.5. Personnel Information:

1.5.1. Pilot-in-Command:

Age	50 Years, Male
License	Commercial Pilot License (Helicopter)
Date of Issue	23.12.2015
Valid upto	22.12.2025
Category	Helicopter
Endorsement	SA316/315, AS350/EC130
FRTOL valid upto	07.12.2025

Date of Class I med exam	20.06.2022
Class I Medical Validity	25.06.2023
Total Flying Experience	2965:30 hrs
Experience on Type	309:40 hrs
Experience as PIC on Type	305:15 hrs
Total Flying Experience in the Last 1 year	196:25 hrs
Total Flying Experience in the Last 30 days	24:45hrs
Total Flying Experience in the Last 07 days	11:25 hrs
Total Flying Experience in the Last 24 hrs	03:20 hrs

1.6. Helicopter Information:

The helicopter EC130-T2 manufactured by Airbus Helicopters and is a single engine light utility helicopter. Certificate of Airworthiness was issued on 16.06.2017 and Certificate of Registration is valid till 31.10.2026. The helicopter VT-HEX is bearing Manufacturer S.No 8275. The maximum All Up Weight authorized for the helicopter is 2500Kgs. Last ARC issued on 08.06.2022 and valid till 07.02.2023.

Helicopter information specific to the engine:

VT-HEX was equipped with ARRIEL 2D Engine S/N: 50917. On 11.04.2022 Pilot defect report was raised which specifies, "During Engine Health Check, Power Margin loss EPC TQ/TOT Margin observed negative (TQ/TOT= -1.7% & TQ/N1= +1.4)". On Trouble-shooting it was observed that abnormal erosion was formed in Module 02 (Compressor) & Module 03 (Gas Generator). Thus Engine bearing S.No 50917 was removed on 02.05.2022 for module replacement. Helicopter was grounded between 11.04.2022 to 02.05.2022. Serviceable ARRIEL 2D Engine S.No 50938 was installed on VT-HEX on 02.05.2022 due to operational reason to make VT-HEX serviceable for further flight. Post installation, 800 Hrs Engine

Inspection was carried out on 02.05.2022, Ground Run performed for leak check & Test Flight also carried out, all found Satisfactory. Last 1200Hrs / 48 months inspection was carried out on 14.03.2022.

Turboshaft engine limitations:

As per the maintenance manual of helicopter, in case of failure message displayed on VEMD, make sure that as engine limitation has really been exceeded before doing the corresponding troubleshooting procedure.

- **The maximum N1 speeds for each rating in the flight envelope are:**

Power Rating	%	rpm
Take-off rating	101.87	53,086
Maximum Continuous rating	99.88	52,050
Idle	67 to 68	34,914 to 35,435
Min. Stabilized	62	32,308
Max. Transient (<20s)	102.97	53,658
Auxiliary backup mode exit threshold	102.8	53,569

- **Temperature Limitation in Flight**
 - At Take-Off: 962°C
 - At 30 Min TOP rating: 962°C
 - At Max. Stabilized rating: 918°C
 - At Max. stabilized rating limited to 20 second: 994°C

Maintenance action performed post incident flight on 03.07.2022:

On 03.07.2022 during the flight when helicopter encountered with the downdraft (discussed in para 1.1), Pilot raised the defect report post completion of sortie at Pahalgam for “Over limit detected (N1 - 102.7% & TOT - 986°C). Trouble-shooting

& Rectification of the Defect carried out as per recommendation of Engine Manufacturer which are as mentioned below:

- Treatment of the Engine after T4.5 over temperature-special procedure as and found Satisfactory.
- Treatment of the Engine after N over speed-special procedure as per EMM and found Satisfactory.
- Engine parameter out of limit after T4.5 over temperature in flight – Trouble-shooting as per TSB and found Satisfactory.
- Inspection/check & Electrical test of Pyrometric harness as per EMM.
- Performed Borescopic Inspection of Module 03 (Gas Generator), Found Satisfactory.
- CRS dated 08-07-2022 & 11-07-2022 issued with limitation for Ground Run & further Recommendation of Manufacturer
- Carried out below mentioned tasks on Engine S/N: 50938 as recommended by Engine Manufacturer prior to Next Ground Run:
 - Engine Oil Changed as per EMM and found Satisfactory.
 - Bleed Valve Filter checked & cleaned as per EMM and found Satisfactory.
 - EDR – Maintenance Flag reset as per EMM and found Satisfactory.
 - CRS dated: 14.07.2022 issued with limitation for Ground Run & FlightCheck
 - Ground Run & Test Flight carried out on 15-07-2022 Found Satisfactory.
- Carried out below mentioned tasks on Engine S/N: 50938 as recommended by Engine Manufacturer after Test Flight:
 - Checked Mechanical & Electrical Magnetic detectors as per EMM and found Satisfactory.
 - EDR data extraction as per EMM and found Satisfactory.
 - All the CRS & report shared with manufacturer
 - After confirmation of the details, Engine Manufacturer released Engine S/N: 50938 for normal operation on 15.07.2022.

1.7. Meteorological Information:

The weather observed on that day was clear skies with adequate visibility to carry out helicopter operation.

1.8. Aids to Navigation:

The only way to navigate in the valley is to follow the reporting points Chandanwari, Sheshnag and Mahaguna Pass. There are no navigational aids available in the valley and helicopter operation is carried out as per the Joint Standard Operating Procedures (SOP).

- **Conduct of Helicopter Pilgrim Operation:**

DGCA has promulgated a Joint SOP for reference and compliance by all operators. As per Joint SOP for Shri Amarnath Yatra Helicopter Operations, the route and reporting points for Panchtarni –Pahalgam route is as follows:-

- (i) Chandanwari - Over Chandanwari, Ht 9700'.
- (ii) Seshnag - Over Seshnag, 12200'.
- (iii) Mahaguna Pass - Over Mahaguna Pass, 14000'.
- (iv) Entering Panchtarni valley - Entering Panchtarni bowl, get visual with Panchtarni helipad.

ROUTE PAHALGAM TO PANCHTARNI

(all heights plus 200' on return route)



1.9. Communication:

Pahalgam and Panchtarni both had helipad base RT Controller and there was a positive communication between helicopter and ground controller. As per the joint SOP:

- All helicopters will stay in R/T contact at each leg on Main and alternate R/T frequencies given by Srinagar ATC.
- Helicopters will report position at each turning point by giving a blind RT call maintaining height bands.
- In case the Captain is in doubt due to missed RT call or about the position of other helicopters, he will not enter the Panchtarni valley.

1.10. Aerodrome Information:

Nil

1.11. Flight Recorders:

Helicopter is not fitted with any flight recorders. However there was an Exceedance of N1 and TOT verified from VEMD.



1.12. Wreckage & Impact Information:

Nil

1.13. Medical & Pathological Information:

The crew had undergone breath analyzer test at Pahalgam before the flight and same was found negative.

1.14. Fire:

There was no pre and post impact fire during the incident.

1.15. Survival Aspects:

Incident was survivable.

1.16. Test and Research:

Nil

1.17. Organizational & Management Information:

M/s Heritage Aviation Pvt. Ltd. is a Non-Scheduled operator with AOP Number

04/2015 having 04 helicopters (01 AS350B3E, 02 EC130T2 and one Agusta 109S) in the fleet. The organization is headed by an Accountable Executive and there are various post holders including Director Operation & Training, director Engineering, Chief of Flight Safety/ SMS manager, director Quality, HOD HR and Chief Security Officer to oversee the day to day activities of the organization to ensure the safe helicopter operation.

1.18.Additional Information: Nil

1.19.Useful and Effective Techniques: Nil

2. ANALYSIS:

On 03.07.2022 M/s Heritage Aviation Pvt. Ltd. EC130-T2 helicopter was carrying out pilgrim operation from Pahalgam- Panchtarni- Pahalgam. A total of 32 landings were carried out since morning at Pahalgam and Panchtarni and all the flights were uneventful.

Serviceability of helicopter:

Helicopter was airworthy and serviceability of helicopter was not a factor to the incident.

Operation Aspect:

- On 03.07.2022, while carrying out the pilgrim operation and during the last sortie of the day, five passengers had boarded the helicopter for Panchtarni and an uneventful landing was carried out at Panchtarni and all passengers were disembarked at Panchtarni.
- Helicopter took off from Panchtarni and the AUW before take-off from Panchtarni was 2076 approximately (including weight of 05 passengers, fuel, Baggage and crew weight). The AUW carried from Panchtarni was within the allowable limit.
- While climbing to cross the Mahaguna Pass, crew felt downdraft and helicopter started sinking. PIC raised the collective control to overcome the downdraft however helicopter kept sinking. PIC raised the collective to full and entered into flattish surface

and started moving ahead. PIC could not make right turn so he made a left turn and came out of the area. During the process of negotiating with the environment condition (downdraft), Engine N1 (Engine Generator Speed) and TOT (Turbine Outlet Temperature) exceeded for a brief period while Nr (Rotor Speed) decreased below safe limits, and associated warnings were recorded. Subsequently helicopter proceeded to the destination and landed safely.

- **Issues Involved in the incident:**

- **Inadequate separation from terrain:** While climbing through 13000 ft, crew experienced a strong downdraft. Location of the incident was about 500 m short of Mahaguna Pass, and at the Pass the crossing altitude of the helicopter should be 14000 ft as per SOP. It was calculated that at the location of the incident (Poshpathri) the helicopter height should be approx. 600 ft AGL so as to maintain the climb gradient and cross the pass with minimum 500 ft AGL margin, at an altitude of 14000 ft. This entails that the altitude of the helicopter should have been at least 13900 ft (600 ft AGL) at Poshpathri, however the helicopter was at 13000 ft. Further from a video footage (verified by crew) it is evident that the pilot has not maintained the minimum separation from terrain, and was flying low in the valley while executing the climb for crossing the pass. At the time the helicopter experienced a downdraft, there was consequently inadequate separation from terrain. The Pilot did not take the appropriate actions to increase power to maximum available, maintain the Vy speed, and fly away from the feature causing the downdraft; he did not take any actions to avoid the downdraft and instead reduced his speed, which further aggravated the situation.
- **Situational Awareness:** The PIC lost situational awareness while encountering the environmental factor of downdraft. Even after exceedance of N1, TOT & Nr, and having received aural warnings for the same during the flight, he did not take cognizance of the same. Helicopter recovered from the situation and landed at Pahalgam. Further after landing at Pahalgam and despite observing the exceedances, he did not switch off the helicopter, instead he continued to carry out another shuttle to Panchtarni and back thereby jeopardizing passenger safety.

- **Weather aspect:** Weather was clear with good visibility for carrying out the helicopter operation. Hence weather is not a factor to the incident.

3. CONCLUSION:

3.1. Findings:

- 3.1.1.** Helicopter VT-HEX was having valid C of A and valid ARC.
- 3.1.2.** PIC License was appropriately licensed and was valid on the day of incident.
- 3.1.3.** Helicopter was engaged in pilgrim operation from Pahalgam- Panchtarni- Pahalgam and at about 1730hrs IST helicopter took off with 05 passengers on board the helicopter for Panchtarni. The helicopter AUV was within the limits.
- 3.1.4.** Helicopter landed at Panchtarni helipad, all the passengers were disembarked and helicopter again took off with 05 passengers for Pehalgam.
- 3.1.5.** PIC while flying the helicopter did not maintaining a safe altitude gradient during climb to Mahuguna pass and was flying very low and close to the valley bottom.
- 3.1.6.** While climbing through 13000 ft crew experienced a strong downdraft. The crew actions to manage the power and maintain the speed were not appropriate to handle downdraft situation.
- 3.1.7.** PIC took incorrect actions to lower the speed and raised the collective to counter the situation, however the helicopter kept sinking. Subsequently he looked for a suitable field for landing and he saw a relatively flat surface ahead.
- 3.1.8.** Crew raised the collective to full and entered into that flattish surface and started moving ahead. PIC could not make a right turn and instead made a left turn to come out of the area. Helicopter then accelerated and climbed to 14000ft. Helicopter subsequently landed at Pahalgam.
- 3.1.9.** During this process of recovery from downdraft, helicopter N1, TOT & Nr exceeded.
- 3.1.10.** Despite the exceedance of N1, TOT & Nr and having received warnings for

the same during the flight, crew did not take cognizance of the same and after landing at Pahalgam again operated the helicopter with degraded engine conditions.

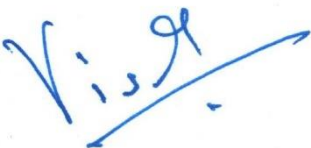
3.2. Probable Cause:

The probable cause of the engine parameters exceedance is attributed to improper handling of flight controls during sudden change in environmental condition (downdraft).

Crew's poor situational awareness for not maintaining a safe height of the helicopter while flying in the valley as per SOP, is a contributory factor to the incident.

4. Safety Recommendations:

4.1 Action as deemed fit be taken in view of finding and cause.



(Capt. Vishal Choudhary)
Senior Flight Operations Inspector (H)
Member, VT-HEX



(Shashi Paul)
Deputy Director of Air Safety
IIC, VT-HEX