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FINAL INVESTIGATION REPORT ON SERIOUS INCIDENT TO AIRBUS H 130 HELICOPTER VT-GVO OPERATED BY M/S GLOBAL VECTRA HELICORP LTD, ON 21 MARCH '2019 AT KATRA HELIPAD

FOREWORD

In accordance with Annex 13 to the Convention on International Civil Aviation Organization (ICAO) and Rule 3 of Aircraft (Investigation of Accidents and Incidents), Rules 2017, the sole objective of the investigation of an accident shall be the prevention of accidents and incidents and not to apportion blame or liability. The investigation conducted in accordance with the provisions of the above said rules shall be separate from any judicial or administrative proceedings to apportion blame or liability.

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

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GLOSSARY

AAIB	Aircraft Accident Investigation Bureau, India
AME	Aircraft Maintenance Engineer
AMM	Aircraft Maintenance Manual
AMSL	Above Mean Sea Level
ARC	Airworthiness Review Certificate
ATC	Air Traffic Control
AUW	All Up Weight
C of A	Certificate of Airworthiness
CAR	Civil Aviation Requirement
CG	Centre of Gravity
CPL (H)	Commercial Pilot License (Helicopter)
CVR	Cockpit Voice Recorder
DFDR	Digital Flight Data Recorder
DGCA	Director General Civil Aviation
FRTOL	Flight Radio Telephone Operators License
Gal/Hr	Gallons/ Hour
GPS	Global Positioning System
IIC	Investigator in Charge
ICAO	International Civil Aviation Organization
IST	Indian Standard Time
KIAS	Knots Indicated Air speed
Lat	Latitude
Long	Longitude
Ltr/Hr	Litre/Hour
METAR	Meteorological Terminal Aviation Routine
MTOW	Maximum Take-off Weight
NM	Nautical Miles
NSOP	Non- Scheduled Operating Permit
POH	Pilot's Operating Handbook
RT	Radio- Telephony
ROD	Rate of Descent
SOP	Standard Operating Procedure
TSN	Time Since New
VFR	Visuals Flight Rules
VOR	VHF Omni-Range
UTC	Coordinated Universal Time

FINAL INVESTIGATION REPORT ON SERIOUS INCIDENT TO M/S GLOBAL VECTRA HELICORP LTD H130 HELICOPTER VT- GVO ON 21-03-2019 AT KATRA, JAMMU.

1.	Helicopter	Type	AIRBUS H130 T2 (EC130 T2)
		Nationality	Indian
		Registration	VT-GVO
2.	Owner		M/s Mikasa Corporation, Japan.
3.	Operator		M/s Global Vectra Helicorp Ltd.
4.	Pilot – in –Command		CPL (H) Holder
	Extent of injuries		NIL
5.	Date & Time of Incident		21-03-2019; 1740 IST.
6.	Place of Incident		Katra, Dist.: Riasi (J& K)
7.	Co-ordinates of Incident Site		Lat 32° 59' 22" N, Long 74° 55 ' 35" E AMSL: 2720 feet.
8.	Last point of Departure		Sanji Chhat Helipad
9.	Intended landing place		Katra Helipad
10.	No. of Passengers on board		07
	Extent of injuries		None
11.	Type of Operation		Shuttle service under NSOP operations
12.	Phase of Operation		Cruise / Descent
13.	Type of incident		Window Ceiling Glazed Panel sheared off and flew In-flight.

(All timings in the report are in IST)

SYNOPSIS

Date and Time	:	21 Mar 2019 and 1740 Hrs
Aircraft	:	Airbus H130 T2 Helicopter
Location Of Incident	:	Katra
Aircraft Owner	:	M/s Mikasa Corporation, Japan
Type of Flight	:	Shuttle Service
Phase of Flight	:	Cruise
Last point of Departure	:	Sanji Chhat Helipad
Point of Intended Landing	:	Katra Helipad
Persons on Board	:	07

Airbus H-130 T2 (EC130 T2) Helicopter VT-GVO, owned by Mikasa Corporation, Japan and operated by M/s Global Vectra Helicorp Limited, was involved in a Serious Incident at Katra, while operating flight from Sanji Chhat Helipad to Katra Helipad, on 21stMarch'2019. The helicopter was under the command of Pilot holding a valid CPL(H). There were 07 passengers on board the helicopter.

The helicopter took-off from Sanji Chhat helipad at around 1735 IST with 07 passengers on board. As per procedure, the Pilot made a take-off call on RT before departure. As per the statement of Pilot, during descent at approximately 5500 Feet AMSL while en-route to Katra Helipad, he experienced a sudden increase in wind inside the cockpit with noise. On inspection of Cockpit, pilot observed that the Window Ceiling Glazed Panel overhead his seat was missing. The pilot immediately took corrective action by reducing the speed of the Helicopter and cut short the Circuit for landing after informing ground control at Katra Helipad on RT. The incident took place at approximately 1738IST. The Helicopter VT-GVO landed safely at Katra Helipad at 1740 IST.

Director General, AAIB appointed Sh Anil Tewari, Director, AAIB as an Investigator – In – Charge & Sh. K Ramachandran, Assistant Director , as Investigator to investigate into the probable cause(s) of the serious Incident vide order No. INV-12011/5/2019-AAIB dated 29 Mar 2019 under Rule 11 (1) of Aircraft (Investigation of Accidents and Incidents), Rules 2017.

Probable cause of the Incident

Non-adherence to the laid down maintenance procedure during fitment of glazed window panel during its replacement and subsequent scheduled and daily inspections resulted into the occurrence.

Hazard Identified During Investigation

Non performance of task as per AMM.

Consequence

Leading to failure of window ceiling glazed glass panel during flight.

1. FACTUAL INFORMATION

1.1 History of Flight

Airbus H-130 Helicopter VT-GVO owned by M/s Mikasa Corporation, Japan and operated by M/s Global Vectra Helicorp Ltd, operates shuttle flights from Katra helipad to Sanji Chhat helipad and vice versa, as per the contract with Mata Vaishno Devi Shrine Board.

On the day of Incident i.e. 21.03.2019, the helicopter had carried out 45 uneventful shuttles between Katra Helipad & Sanji Chhat helipad. The incident happened during the 46thshuttle of the day. The first 25 shuttles of the day on the helicopter were operated by another pilot of the operator. There was no snag reported by the pilot. Thereafter, the next 21 shuttles on the helicopter were flown by the involved pilot and there was no snag reported before the incident flight.

The helicopter took-off from Sanjhi Chhat helipad at around 1735 IST with 07 passengers on board. As per procedures, the pilot made a “Take-Off Call” on RT before the departure. As per the statement of Pilot, he carried out pre-flight inspection of the helicopter before his first flight of the day and did not notice any abnormality. He further stated that while en-route to Katra Helipad, during descent at approximately 5500 Feet AMSL at a ROD of 155 Feet / Min with a speed of 110 Knots, he experienced a sudden gust of wind inside the cockpit with noise. On inspection of cockpit, Pilot observed that the window glazed panel overhead his seat (LH side)flown off. The pilot immediately took corrective action by reducing the speed of the Helicopter and simultaneously informed ground control at Katra Helipad on RT. Further, he clearly transmitted the cockpit situation to Katra Ground control and informed that he will approach the Katra Helipad for landing by cutting the circuit short. The incident took place at approximately 1738 IST. The Helicopter landed safely at Katra Helipad at 1740 Hrs IST.

There was no injury to any of the occupant on board the helicopter. There was no pre or post landing fire.

Photograph # 1: Google Earth Ariel View of incident Site of VT-GVO

1.2 Injuries to Persons

Injuries	Crew	Passengers	Others
Fatal	NIL	NIL	NIL
Serious	NIL	NIL	NIL
~~Minor~~/None	01	07	NIL

1.3 Damage to Helicopter

The helicopter received minor damage during the incident. One of the main Rotor Blade received a dent on the lower portion.

1.4 Other Damages: No other damage was observed.

1.5 Personnel Information

1.5.1 Pilot- in- Command

Age	:	49 years
License	:	CHPL
Date of License Issue and Valid up to	:	12/10/2011 & 11/10/2021
Category	:	Helicopter (Single Engine)
Endorsements as PIC	:	Chetak/BELL407/H125/H130
Date of FRTOL issue & validity	:	12/10/2011 & 11/10/2021
Date of Med. Exam & validity	:	11/01/2019 & 28/07/2019

Date of Route Check	:	30/10/2018
Date of Last Proficiency Check	:	04/02/2019
Date of last CRM	:	13/12/2018
Date of Dangerous Goods Awareness Training	:	03/01/2018
Date of last Simulator	:	25-26 Oct 2018
Total flying experience	:	4284:40 Hours
Total Experience on type	:	583:05 Hours
Total Experience as PIC on type	:	468:10 Hours
Last flown on type	:	21/03/2019
Total flying experience during last 01 Year	:	374:25 Hours
Total flying experience during last 180 days	:	196:45 Hours
Total flying experience during last 30 days	:	50:35 Hours
Total flying experience during last 07 Days	:	22:30 Hours
Total flying experience during last 24 Hours	:	02:55 Hours
Rest period before the flight	:	25:05 Hrs

1.6 Helicopter Information

1.6.1 General Description

The **Airbus Helicopters H130** (earlier **Eurocopter EC130**) is a single engine light utility helicopter developed from the earlier Eurocopter AS350 Écureuil. One of the primary changes was the adoption of a Fenestron anti-torque device in place of a conventional tail rotor. It was launched and produced by the Eurocopter Group, which was later rebranded as Airbus Helicopters. The helicopter is certified in transport category, for day operation under VFR.

The H130 Helicopter was designed in close cooperation with tour operators. It is having a spacious cabin for accommodating up to seven passengers (tourists) and providing excellent external visibility. The manufacture of H130 helicopter is principally aimed at commercial operations.

The maximum operating ceiling of this helicopter is 23000 feet and maximum take-off weight is 2500 Kgs. Helicopter length is 12.64 meters, width is 2.73 meters and height of this helicopter is 3.61 meters. The standard helicopter seating configuration is 01 pilot and 07 passengers. Helicopter is having 03 main rotor blades, with Fenestron.

Main Structure

The fuselage serves as a platform for the helicopter systems, crew, passengers and payload. The main structure is based on modular concept that simplifies the assembly of the helicopter and permits the replacement of individual modules preventing disassembly of the entire fuselage.

The components of the fuselage are:-

- The canopy,
- The main structure is composed of the bottom structure/cabin floor, body structure and the rear structure,
- The aft structure (tail boom, horizontal stabilizer, Fenestron).

The cabin floor is composed of 2 panels made of light alloy which rest on 2 longitudinal beams. It is reinforced with cross members, and protected by lower fairings.

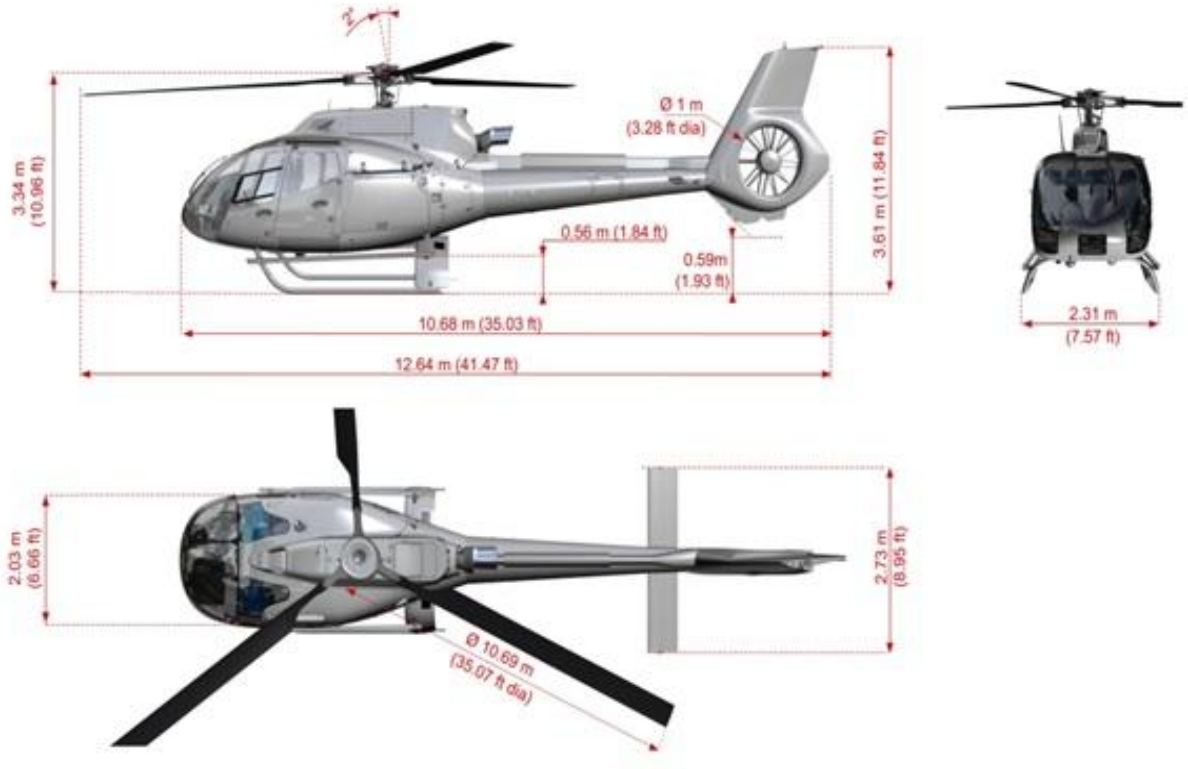
The body forms a rigid box structure. It also supports the dynamic components, landing gear, cabin floor, rear structure and fuel tank and external loads (if equipped with a cargo hook).

The rear structure forms the rear baggage compartment and houses the electrical master box, the Engine Electronic Control Unit (EECU) and various electrical components. The rear structure consists of 3 frames joined by beams. The two forward frames and beams support the engine, the third is the tail boom junction frame made from a machined light alloy ring. The aft jacking point is on the junction frame.

Canopy

The canopy comprises the forward section above the cabin floor. It is designed to function as a frame. It consists of the following:-

- Cabin framework,
- Cabin ceiling,
- Cabin nose.



Photograph # 2: Primary dimensions of the helicopter H130

Windows and Windshields

The purpose of windows and windshields of the helicopter is:-

- To provide extensive visibility,
- To protect the helicopter crew and passengers.

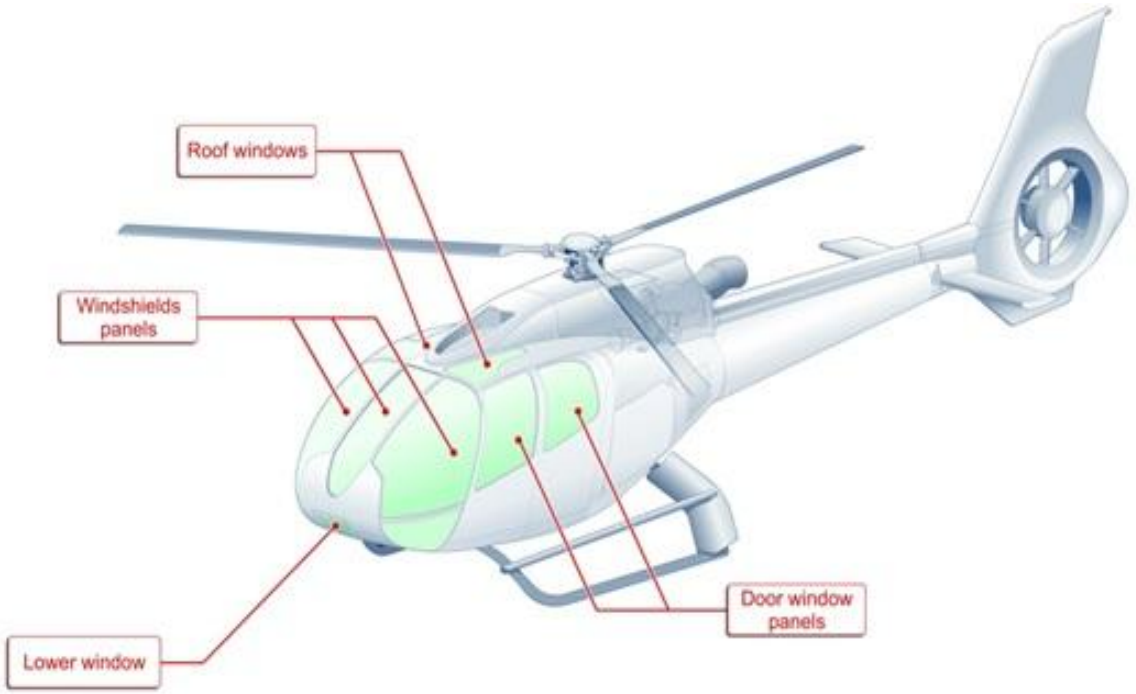
All windows are tinted in the basic definition of Helicopters. The translucent transparent panels are fitted on the cabin doors.

All transparent panels of the aircraft include:-

- **Windshield Panels**: the left windshield panel, the central windshield panel and the right windshield panel, are bonded to the uprights of the canopy. They are an integral part of the stressed structure of the aircraft. They are streamlined in shape.
- **The Lower Window**: the central lower window is installed with screws and a seal.
- **The Roof Windows**: the left roof window and the right roof window are single-layer windows. As an option, roof windows with a multi-layer heatshield to protect the cabin from the rays of the sun can be installed. The incident helicopter VT-GVO was fitted with single layer window only.

- **The Door Window Panels**: the windows of the left cabin door and the right cabin door, the sliding door are bonded and have a sealing bead around their circumference.

The right forward door and the left forward door can have a sliding weather window as an option.



Photograph # 3: An Overview of Windows and windshields of H130

1.6.2 Helicopter Information (VT-GVO)

Helicopter Model	:	Airbus H 130
Helicopter S. No.	:	8066
Year of Manufacturer	:	2015
Certificate of Registration (C of R) No.	:	4580/2
Certificate of Airworthiness (C of A) No.	:	6690
Certificate of Airworthiness Validity	:	Valid at the time of accident
Airworthiness Review Certificate (ARC) issued on	:	08.06.2018

ARC valid up to	:	10-06-2019
Engine Type	:	Arriel 2D
Engine Sl. No.	:	50358
Helicopter Empty Weight	:	1540.41 Kgs
Maximum Take-Off weight	:	2500 Kgs
Date of Helicopter weighment	:	11.05.2015
Total Airframe Hours	:	3056:45 Hrs
Engine Hours (Since New)	:	3618:22 Hrs

The Helicopter is registered in “Normal” category & Sub Division - “Passenger Aircraft”. The Certificate of Airworthiness remains valid subject to validity of Airworthiness Review Certificate. The Helicopter is operated under Non-Schedule Air Operator Permit (NSOP) No. 08/1998 issued on 04.04.2018 and is valid upto 28.04.2023.

The Helicopter was holding a valid Aero Mobile License No. A-004/025/WRLO-15 at the time of Incident. The Aero Mobile license was issued on 15.06.2018 and was valid at the time of incident.

The aircraft was last weighed on 11.05.2015 at M/s Indocopter Pvt Ltd, Greater Noida and the weight schedule was duly approved by the office of Director of Airworthiness, DGCA (WR), Mumbai. As per the approved weight schedule, the Empty Weight of the Helicopter is 1540.41 Kgs and Maximum Take-Off Weight (MTOW) of the Helicopter is 2500 Kgs. Maximum usable fuel quantity is 425 Kgs. Maximum payload with fuel tanks full is 478 Kgs. Empty weight CG is 3.61 Centimeters aft of datum (3.40 Mts forward of Main Rotor Head Centerline).

Helicopter had logged 3056:45 hours till the date of occurrence. Last scheduled inspection carried out on the Helicopter was inspection operation 150 / 12 Months at 3005:45 airframe hours on 23.02.2019. The aircraft had logged 51:00 Hrs since last scheduled inspection. Pre-flight inspection was carried out by the AME before the first

flight on the day of occurrence. Prior to the incident flight, the helicopter had flown for 04:45 Hrs with 92 landing on the day of occurrence.

As on date of occurrence, the helicopter Engine had logged 3618:22 Hrs since new. Last “Scheduled Inspection” carried out on the engine was inspection 600 Hrs / 24 Months at 3282:32 EH (since new) on 27.10.2018.

All concerned Airworthiness Directives, Mandatory Service Bulletins, DGCA Mandatory Modifications on this helicopter and its engine has been complied with as on date of incident.

Scrutiny of snag register revealed that, there was no snag pending on the helicopter prior to the incident flight. The last snag recorded in the snag register was on 31.01.2019 and the snag was “Heading Display Button of HIS found loose”. The rectification action carried out was “HIS K1525A replaced with new serviceable one”.

Last snag on upper glaze panel window was observed during 600 hrs/24 Months inspection at 2720:55 Hrs dated 27.10.2018. Rectification action was “glass panel (P/N 350A25-90-40-21) replaced with serviceable one”. As per the Work Package, the installation/replacement procedure started on 23.10.2018 and finished on 26.10.2018.

Load and trim sheet of the incident flight was prepared and Centre of Gravity was found with in limit.

Main Rotor Blades

The Airbus H130 Helicopter VT-GVO is fitted with 03 Main Rotor Blades, details are:

S.No	Part No	Component Serial No	Component Hrs
1.	355A-11-0030-04	43462	3056:45 Hrs*
2.	355A-11-0030-04	43369	3056:45 Hrs
3.	355A-11-0030-04	43478	3056:45 Hrs

* Rotor blade damaged during the incident

1.7 Meteorological Information

There is no MET office at Katra or Sanji Chhat Helipads. The MET information is generally taken from Udhampur/Jammu. During the time of occurrence, the reported weather was above minima of PIC for conduct of VFR flying.

1.8 Aids to Navigation

The Helicopter is only VFR cleared and is equipped with necessary navigational aids as per regulations e.g. ADF, VOR, ATC Transponder and GPS. Helicopter was flying VFR flight from Sanji Chhat Helipad to Katra Helipad.

1.9 Communication

At the time of incident, the helicopter was not in contact with any ATC, since it is not required as per the Joint SOP for helicopter operations from Katra to Sanji Chhat helipad. As per the SOP, the helicopter will report position at each designated point by giving RT calls maintaining height bands which would be acknowledged by other helicopter, if flying. All RT call were made as per SOP.

1.10 Aerodrome Information

Katra Helipad is located in Katra, Dist Riasi, Jammu and Kashmir and is used for helicopter operations for ferrying pilgrims visiting Shri Mata Vaishno Devi Shrine. The helicopter service is provided between Katra helipad and Sanji Chhat Helipad (Sanji Chhat Helipad is about 2 Kms from the shrine). The helipad is owned by Shri Mata Vaishno Devi Shrine Board. Katra and Sanji Chhat Helipads are constructed out of concrete and are marked with a letter "H", so as to be visible from the air. 03 helicopters can be parked at Katra helipad and 01 helicopter can be parked at Sanji Chhat helipad at any given time. The emergency services covering fire and medical are available at both helipads.

The details of the helipads are:-

Helipad	**Co-ordinates**	**Dimensions**	**Take-off/Approach Direction**	**Helipad Elevation**
Katra	32° 59’ 17” N 74° 56’ 52” E	58 m x 38 m	North West/ South East	2900 feet
Sanji Chhat	33° 01’ 17” N 74° 56’ 20” E	45 m x 29 m	360° North/030° East	6000 feet

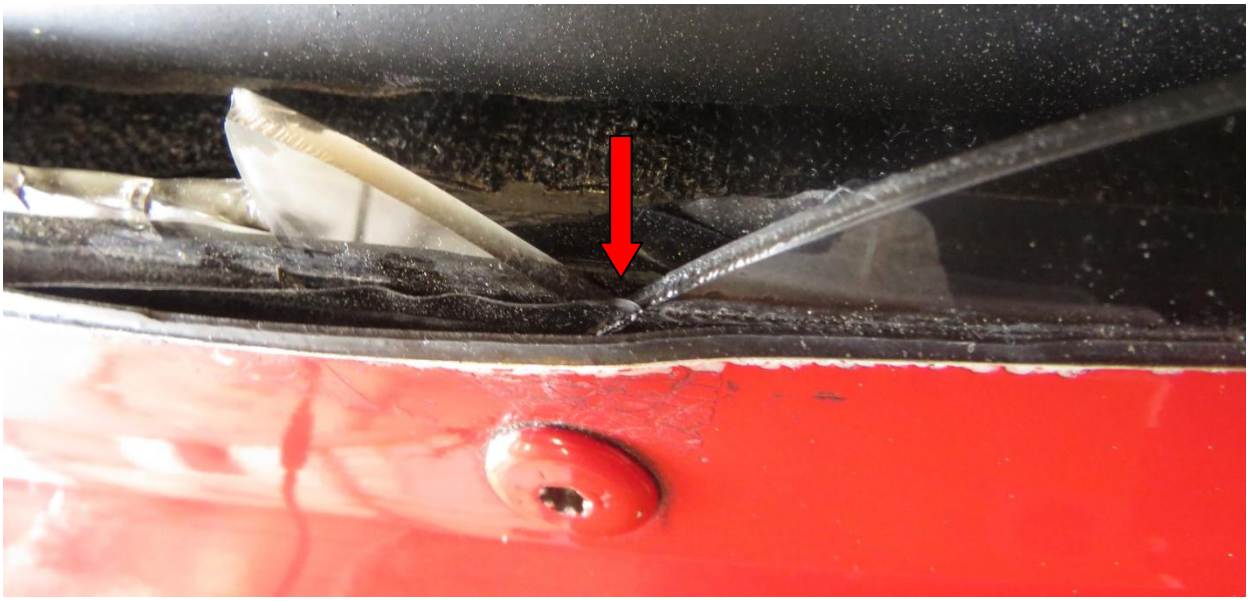
1.11 Flight Recorders

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

1.12 Wreckage & Impact Information

The LH Window glazed panel flew – off in air during flight and hit one of the main rotor blades which was evident from the minor dents observed on the lower surface of the rotor blade. A small portion of the window glazed panel remained intact with the structure. Apart from the LH window glazed panel, there was no evidence of any other part of the helicopter disintegrating during the flight. The separated portion of the window glazed panel could not be located / traced.

Photograph # 4: Missing LH Window Glazed Panel.



Photograph # 5: Probable point of initiation of crack.

Photograph # 6: Dents on oneof the Main Rotor Blades

During the inspection of the window ceiling attachment area, a lot of lump formation and uneven surface was observed around the periphery of adhesive application area over which the glazed panel is fixed (Refer Photograph # 7).

Photograph # 7: Uneven surface & Lumps found on periphery of adhesive area

1.13 Medical & Pathological Information

The pilot had undergone pre-flight medical and Breath Analyzer test prior to operating the first flight of the day and also after the incident. The pilot was not found under the influence of alcohol.

1.14 Fire

There was no pre or post landing fire.

1.15 Survival Aspects

The incident was survivable.

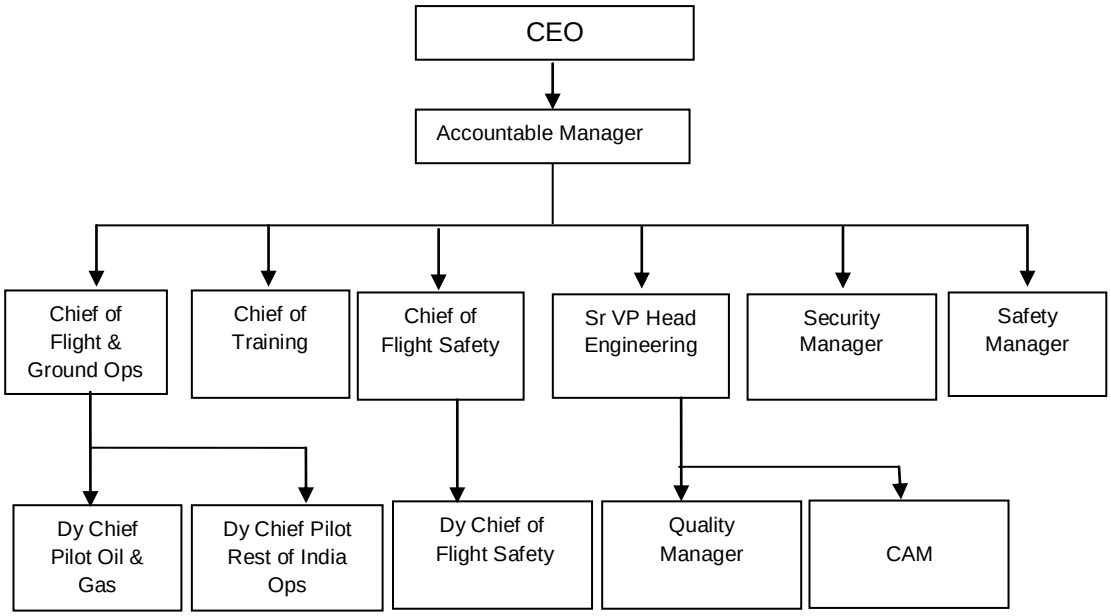
1.16 Test and Research

NIL

1.17. Organizational & Management Information

M/s. Global Vectra Helicorp Ltd (GVHL), is a Non-Scheduled Air Transport Operator, engaged in helicopter operations from its main base at Civil Aerodrome, Juhu Airport, Mumbai. GVHL was granted the Non-Scheduled Operations Permit under NSOP No. AOP-08/1998 dated 01 Jan 1999 issued by DGCA. The AOP is valid upto 28 Apr 2023.

The organization chart of GVHL placed below depicts the relationship between Operations Department and other Departments of the Company. Subordination and reporting lines of all Divisions and Departments, pertaining to safety of flight operations, have been shown in the organisation chart.



GVHL has two divisions – Offshore and Onshore. It operates mixed fleet of aircraft as listed below: -

Type of Helicopter		Total No. of Helicopters
Bell 412 EP	:	15
H130 T2 (EC 130 T2)	:	02
EC 135 P2+	:	01
AS 350 B3	:	02
AS 350 B3e	:	02
AW 139	:	04
Leonardo AW 169	:	02

The maintenance of the helicopters is carried out by Indocopter Private Limited (ICPL) which is a DGCA approved CAMO & CAR–145 Maintenance Organization. The maintenance is carried out by its own Quality Control Personnel.

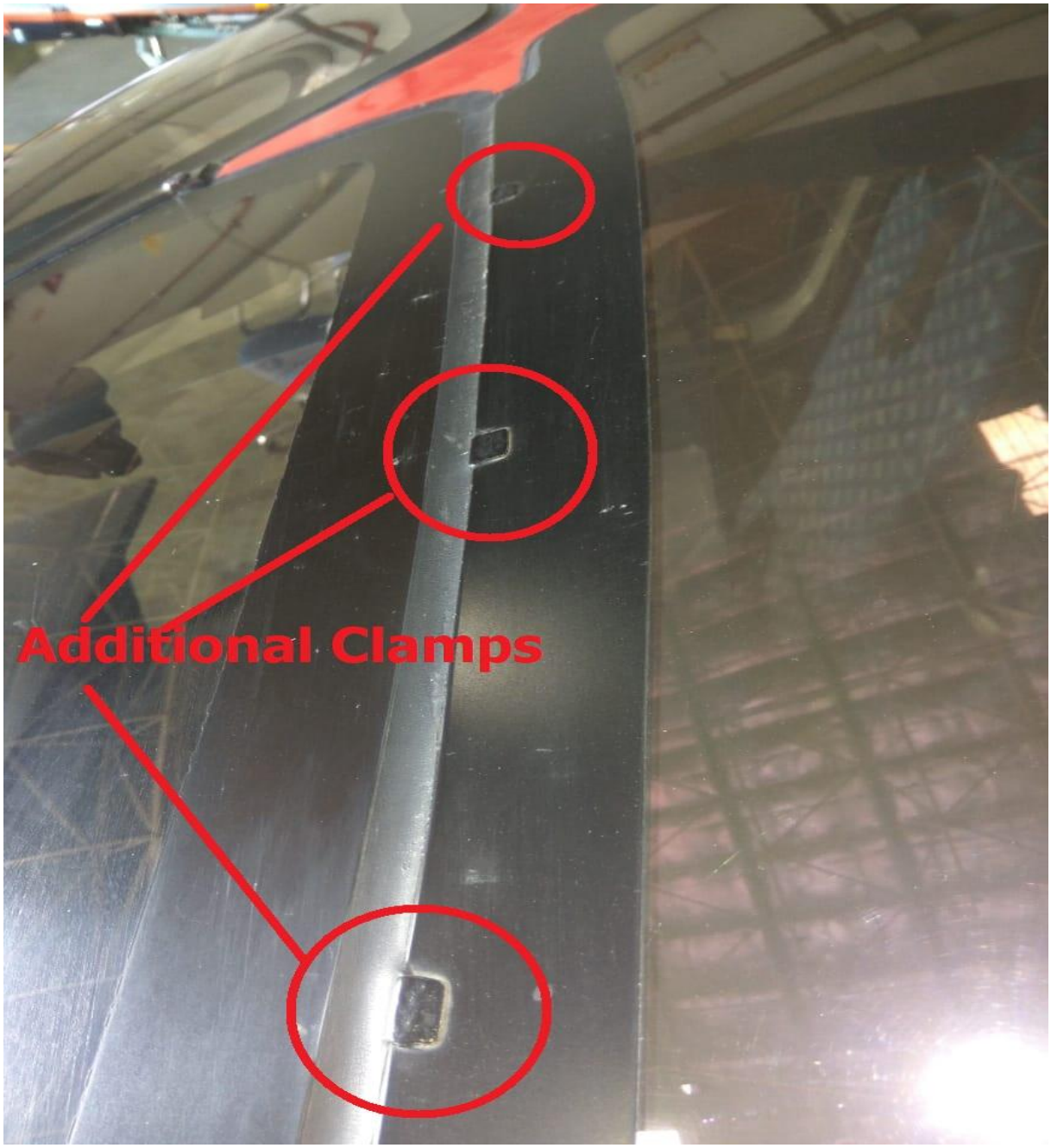
1.18 Additional Information

1.18.1 Window Ceiling fitted with additional layer of heatshield along with plexiglass.

LH & RH window ceiling of the H130 T2 helicopter are fitted with single-layer glazed panel made of plexiglass (as in case of incident helicopter VT-GVO) having part numbers 350A25-9040-21 for LH side (Pilot side) & 350A25-9039-21 for RH side. Both single layer glazed panel are simply pasted to its position and a rubber seal pasted around on the top to protect from radiation (Refer Photograph # 8).

However, as an option, windows ceiling with a multi-layer heatshield to protect the cabin from the rays of the sun can also be installed. The latest version of H130 T2 helicopters are installed with this multi-layer glazed window ceiling panel having different part number from that of single layered one i.e. SGSEGEC1301120is the part number for LH side (pilot side)& SGSEGEC1301220 for RH side. This multi-layer ceiling window glazed panel consists of additional layer of heatshield along with plexiglass and is fitted to its position with additional holding clamps positioned circumferentially (Refer Photograph # 9). Replacement and Installation procedure for both type of window ceiling glazed panel is mentioned in AMM 56-11-00 of Helicopter. *Further, no service bulletin or Modification had been issued by OEM till the date of incident on installation / replacement of glazed panel. Relevant copy of AMM is annexed to this report as Annexure I.*

Photograph # 8: Single layer glazed window



Photograph # 9: Multilayer glazed window ceiling with additional clamps

1.18.2 Before First Flight and After Last Flight Inspection.

As per the procedure laid down in the Maintenance Manual of H130 T2 helicopter, there are two inspections which need to be carried out in a day i.e. Before First Flight (BFF) Inspection and After Last Flight (ALF) Inspection. The procedure for Pre-flight Inspection is annexed as Annexure II to this report.

In Pre-flight Inspection, there are specific check(s) for the condition & cleanliness of all transparent panels which includes window ceiling glazed panel also.

1.19 Useful &Effective Techniques

Nil

2. ANALYSIS

2.1 Serviceability of Helicopter

The Helicopter Airbus H130 T2 Serial No. 8066 was manufactured by M/s Airbus, France in 2015. The Helicopter was having valid Certificate of Registration (C of R) at the time of incident. It holds valid Indian Certificate of Airworthiness (C of A) under category Normal, Sub-Division Passenger and valid for lifetime. Airworthiness Review Certificate was issued on 08.06.2018 and was valid at the time of incident. The helicopter had done 3056:45 Airframe Hrs and 3618:22 Engine Hrs till the day of Incident. The last scheduled inspection (150 Hrs / 12 Months) was carried out at 3005:45 Hrs on 23 Feb 2019. There was no snag reported by the pilot before the incident flight and as per records there was no recurring defect either.

In view of the above, it is considered that the serviceability of the helicopter is not a factor to the Incident.

2.2 Weather

The weather at Katra at the time of incident was reported to be fine with clear sky, visibility of 6000 Mtrs, winds 250^{o}/03 knots and Temperature 24.5^{o}C.

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

2.3 Maintenance Aspects

As per the records, the scheduled and unscheduled maintenance on VT-GVO is being carried out as per AMM. During further scrutiny of documents, it emerged that the window ceiling glazed panel (LH) which flew off on 21 Mar 19 was replaced on 23 Oct 2018 at 2720:55 AF Hrs. The replacement of window ceiling glazed panel on 23 Oct 2018 was necessitated since a crack was noticed during 600 Hrs scheduled inspection. The replacement work which started on 23 Oct 2018 was completed on 26 Oct 2018. The Helicopter VT-GVO was declared serviceable on 26 Oct 2018 after 600 Hrs

inspection and was air tested on 27 Oct 2018.Therefore, it took only four days i.e. from 23 Oct 2018 to 26 Oct 2018 to complete the procedure of replacing LH glazed window panel. Whereas as per AMM 72 Hrs of curing time is adequate after the replacement of glazed panel but before releasing the helicopter for operations.

This became further evident, when after the occurrence, the surface preparation for installation of new window ceiling glazed panel was carried out by M/s ICPL maintenance team in the presence of Investigation team. The activity of surface preparation with specialized tools itself took 03 days to complete as per AMM. As per the Work Package, the procedure started on 01.04.2019 and completed on 10.04.2019 i.e. it took approximately 10 days to complete the task as per AMM.

As brought out earlier, the single layer glazed panel is simply pasted to its position with adhesive. As per AMM, the surface preparation activity for replacement / installation of glazed window panel is to be performed with surgical precision. During investigation, a lot of lump formation and uneven surface was observed around the periphery of adhesive application area over which the severed glazed panel was fixed. Thereby, depicting that surface preparation, adhesive application and adequate curing time was not given to fix the glazed panel to its position at the time of replacement of window ceiling glazed panel. As the plexiglass was not bonded properly with the surface, de-bonding started over a period of time. The same was also not noticed during 150 hrs/12 months scheduled inspection which was carried out on 23.02.2019, approximately 01 month before the occurrence. Further, it was not noticed during the BFF on the day of occurrence.

It was further interpreted that a crack must have started developing from glass alignment spacer due to non-adherence of correct maintenance procedure as per AMM which kept on propagating in general direction till the time it gave away.

Hence, not adhering to correct maintenance practices at the time of replacement of window ceiling glass panel on 23 Oct 2018 and subsequent inspections (150 hrs/12 months & BFF/ALF) resulted in its flying off during the flight.

2.4 Circumstances Leading to Incident

As crack was noticed during 600 Hrs scheduled inspection, the LH window ceiling glazed panel was replaced in Oct 2018. The replacement work was completed in only

04 days. A lot of lump formation and uneven surface was also observed around the periphery of adhesive application area over which the glazed panel is fixed. This implies that the surface preparation, adhesive application or adequate curing time was not given to fix the glazed panel to its position at the time of replacement of window ceiling glazed panel. This resulted in the glazed panel not bonding properly with the surface. It is to be noted that the single layer glazed panel which is simply pasted to its position with adhesive and there is no other bonding material used, started de-bonding over a period of time.

It is inferred that a crack must have developed from glass alignment spacer which kept on propagating in general direction over a period of time which was also not noticed during 150 hrs/12 months scheduled inspection which was carried out on 23.02.2019, approximately 01 month before the occurrence and daily inspections (BFF & ALF) resulting in glazed panel flying off during flight.

3. CONCLUSION

3.1 Findings

1. The Certificate of Airworthiness, Certificate of Registration & Certificate of flight release of the helicopter was valid on the date of Incident.
2. The pilot was having a valid license, medical and was qualified on type.
3. On the day of incident, prior to the incident flight, a total of 45 shuttles were done by the helicopter. All these shuttles were uneventful.
4. There was no snag reported prior to the incident flight.
5. Before his first flight of the day, the pilot carried out pre-flight inspection and no abnormality was reported.
6. During the 46th shuttle en-route to Katra Helipad from Sanji Chhat helipad, pilot noted that ceiling window glazed panel overhead his seat has flown off.
7. The pilot cut short the circuit and landed immediately after informing Katra ground on RT.
8. The helicopter landed safely and there was no injury to any of the occupant.
9. During scrutiny of the records, it was revealed that the LH window glazed panel which flew off during the incident was replaced in Oct 2018 as a crack was noticed during 600 hrs scheduled maintenance.
10. The replacement of window ceiling glazed panel was completed in only 04 days which was not adequate as per AMM.

11. A lot of lump formation along with uneven surface was observed around the periphery of adhesive application area over which the glazed panel is fixed. Thereby, confirming that the adhesives were not applied properly/evenly or adequate curing time was not given while fixing the glazed panel to its position.
12. There was inadequate bonding of glazed panel with the surface.
13. This helicopter is fitted with single layer glazed panel pasted to its position only with adhesive, it started de-bonding over a period of time.
14. A crack had developed from glass alignment spacer and kept on propagating in the general direction over a period of time which resulted in glazed panel flying off during flight.
15. The same was also not noticed during 150 hrs/12 months scheduled inspection which was carried out approximately 01 month before the occurrence and during daily inspections (BFF & ALF) resulting in glazed panel flying off during flight.
16. Weather at the time of incident was fine.

3.2 Probable Cause of the incident

Non-adherence to the laid down maintenance procedure during fitment of glazed window panel during its replacement and subsequent scheduled and daily inspections resulted into the occurrence.

4. Safety Recommendations

DGCA may reiterate to all operators having H130 helicopter to strictly adhere to the scheduled and preflight inspections procedures as mentioned in AMM giving more emphasis on inspection of window ceiling glazed panel.

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Date: 28 Oct 2019
Place: New Delhi