

**REPORT ON ACCIDENT TO  
HIMALAYAN HELI SERVICES PVT. LTD.  
LAMA HELICOPTER VT-WEX NEAR  
SHRI AMARNATHJI HELIPAD ON 09.07.2009**

1. Helicopter
  - a. Type and Model : SA315B Lama Helicopter
  - b. Nationality : Indian
  - c. Registration : VT-WEX
2. Owner/Operator : Himalayan Heli Services Pvt. Ltd., 104, 7 LSC Madangir, New Delhi-62
3. Date of Accident : 09.07.2009
4. Time of Accident : 07:30 IST.
5. Last Point of Departure : Baltal Helipad
6. Point of Intended Landing : Sh. Amarnathji Helipad
7. Geographical Location of Accident : At a distance of 500 m from Sh. Amarnathji Helipad  
**Coordinates:**  
Latitude : N 34° 12'55"  
Longitude : E 75° 30'40"  
Height : 11,700 ft.
8. Type of Operation : Non-scheduled Operation
9. Phase of Operation : During approach for landing

**(All timings in the report are in IST)**

## SYNOPSIS

On 09 July 2009 Himalayan Heli Services SA315 B Lama Helicopter VT-WEX was engaged in the carriage of the pilgrims from Baltal Helipad to Sh. Amarnathji Helipad for the darshan of Sh. Amarnathji and back. It started the operation at 6:05 IST and had made five trips. During the sixth trip, while landing at Sh. Amarnathji helipad, helicopter experienced sudden sink and crashed at 500 meters away from the cave helipad at 07:30 IST. The accident was immediately notified to the regulatory authority by M/s Himalayan Heli Services and the ATC Srinagar.

The accident was investigated by Inspector of Accident under Rule 71 of Aircraft Rules, 1937. As per the obligations under ICAO Annex 13, notification was sent to BEA France, the State of helicopter manufacture. BEA France appointed its accredited representatives and authorized Helicopter manufacturer M/s Eurocopter to associate with the investigation of engine. Bench check of Fuel Governor and Fuel Pump was carried out at the manufacturer's facility in France under supervision of BEA France.

At 07:20 hrs. (approx.) with total of 4 passengers on board, it took off from Baltal for the sixth trip. During the flight as per procedure, helicopter flew along the right side of the valley, viewed from Sangam and made call at the designated reporting points "Echo", "Delta", "Gorge" and "Sangam". Thereafter, it entered Sh. Amarnath Ji valley at an altitude of 12100 feet. In the valley, as there was no other traffic ahead of it or returning back, it flew almost near the center of the valley on the right side.

The pilot made a steeper approach for the Himalayan Heli Services helipad, but did not apply correct technique for the steeper approach. Due to this, on the short finals of the approach, he felt the helicopter sinking with a high rate of descent. He pulled full collective to get a quick recovery and took a right turn. He tried to build up speed to gain transition lift. He was now flying on the right side of the valley as viewed from the Sangam. After executing right turn the helicopter climbed to about 12030ft. He decided to make an emergency landing in the middle of the valley instead of going forward to avoid hitting the tents further down the valley. Accordingly, at around 500mts downstream of Sh. Amarnathji helipad, he turned 180 degree right, across the width of the valley and in the process it passed over a hill (Sadhu Padav) of height **11800 ft.** on the left side(out going route) of the valley. He initiated flaring to check the speed. While approaching the valley from the Sadhu Padav hill, the skid of the helicopter hit a female pilgrim on the pedestrian road flanking the valley, at the back of her head (Lower occipital region). Thereafter helicopter approached the accident site in a pitch up attitude and crashed in the middle of the valley.

Due to impact helicopter was substantially damaged and there was no fire. Due to injuries sustained the pilgrim on the road died while passengers and the crew sustained minor to serious injuries.

# **1. FACTUAL INFORMATION**

## **1.1 History of the Flight**

On 09 July 2009 Himalayan Heli Services SA315 B Lama Helicopter VT-WEX was engaged in the carriage of the pilgrims from Baltal Helipad to Cave Helipad for the darshan of Sh. Amarnathji and back. It started the operation at 6:05 IST and had made five trips. During the Sixth trip, the helicopter took off at around 07:20 IST from Baltal helipad with 04 Passengers and one pilot.

Helicopter operates between Baltal and Amarnath as uncontrolled Visual Flight Rule (VFR) Flight. As per the witnesses the weather was clear and visibility was good both at Baltal and Sh. Amarnathji Helipad. The operation was coordinated with Srinagar ATC. Srinagar ATC does not have any RT contact with the helicopter. The Air Defense Clearance was Y-12 and NC was 34A.

On 9<sup>th</sup> July, 2009 the preflight inspection as per the approved schedule was carried out by the BAMEL Holder and no snag was observed by him. He has been issued authorization for pre-flight/transit inspection by M/s Mesco. The approval was valid on the day of accident. As per the procedure he checked the bottom samples of the fuel from both the fuel tanks, fuel filter and found them to be satisfactory. He also checked the fuelling kit and found it to be satisfactory. He up lifted 155 lts of fuel and 145 lts. fuel was already in the tank. The total fuel being 300lts at the start of operation on the day.

At 06:05 IST the helicopter took off for the first trip after inspection by the pilot. The Pilot subsequently carried out four more trips without switching off the engine at either of the helipad and no snag was observed by him. At 07:20 hrs. (approx.) with total of 4 passengers on board and 130 liter of fuel, he took off from Baltal for the sixth trip. As per him, The JPT, oil pressure and oil temperature readings and other instruments were showing normal. There was no abnormality in the take-off. During the flight as per the procedure Helicopter flew along the right side of the valley, viewed from Sangam and made calls at the designated reporting points "Echo", "Delta", "Gorge" and "Sangam". Thereafter, he entered Sh. Amarnathji valley at an altitude of 12100 feet. In the valley, as there was no other traffic ahead of it or returning back, he flew almost near the center of the valley on the right side.

He made a straight in approach for the Himalayan Heli Services helipad. His collective pitch margin was 0.85% till commencement of the approach, thereafter it was reducing during deceleration. On the short finals of the approach, he felt the helicopter sinking with a high rate of descend. He pulled full collective to get a quick recovery and took a right turn. The statement of the crew is corroborated by the Himalayan Heli services ground handling in charge at cave helipad, who was positioned at helipad to marshal the helicopter and other eyewitnesses. The

ground handler observed the approach of helicopter to be normal and almost along the center of the valley but it was at higher altitude than the normal. Over head the helipad, the helicopter made a turn to align for landing. Immediately thereafter helicopter experienced loss of lift and descended below the helipad level short of the helipad and then made a turn towards right (incoming route). At short distance up stream of the helipad there is hill/glacier which blocks the mouth of the valley. The pilot tried to build up speed to gain transition lift. He was now flying on the right side of the valley as viewed from the Sangam. After executing right turn the helicopter climbed to about 12030ft. Around this point of time the crew of other helicopter gave calls to VT-WEX. However there was no response. He was flying at a speed of 50 knots and 0.95% collective. He decided to make an emergency landing in the middle of the valley instead of going forward to avoid hitting the tents further down the valley. Accordingly, at around 500mts downstream of the cave helipad, he turned 180 degree right across the width of the valley and in the process it passed over a hill (Sadhu Padav) of height **11800 ft.** on the left side(out going route) of the valley. He initiated flaring to check the speed. While approaching the valley from the Sadhu Padav hill, the skid of the helicopter hit a female pilgrim on the pedestrian road flanking the valley leading to the cave, at the back of her head (Lower occipital region) and she died. Thereafter helicopter approached the accident site in a pitch up attitude. The tail rotor impacted the ridge/ stone in almost the middle of the valley and due to impact the tail rotor separated. Due to loss of tail rotor the directional control was lost and helicopter went into spin. In the process the forward portion of left skid of the helicopter hit one of the rocks. The helicopter toppled on the right side and came to rest.

The coordinates of accident site are Latitude: N 34° 12'55", Longitude : E 75° 30'40", Height : 11,700 ft. Accident occurred during the day time in the clear weather conditions. The accident site is the bottom of the narrow Sh. Amarnathji valley and is covered by a glacier. Due to impact helicopter was substantially damaged and there was no fire. Passengers and the crew sustained minor to serious injuries. All occupants were rescued from the helicopter by general public, security forces and the employees of Himalayan Heli Services and sent to the first aid camp/hospital for treatment.



*Topographic chart indicating Take off helipad, the flight path, reporting points, landing helipad & the accident site*

- Reporting points
- The flight path,  
The dotted is the flight path after aborted landing.

## 1.2 Injuries to persons

Injuries	Crew	Passengers	Others
Fatal	Nil	Nil	One
Serious	One	Two	Nil
Minor/None	Nil	Two	

## 1.3 Damage to aircraft

Lama Helicopter was substantially damaged due to impact.

## 1.4 Other Damage

Nil

## 1.5 Personnel information

### 1.5.1 Pilot-in-Command

After obtaining supernation from Indian Army, he joined Himalayan Heli Services in June 2007. His date of birth is 03.12.1961. He received his initial helicopter training at Indian Air Force training school at Hyderabad, India in the year 1988. He last flew with the Indian army on 25<sup>th</sup> July, 2005.

Due to absence from flying for two years, at the time of joining organisation he underwent familiarization flying training of 45 minutes, three takeoffs and landing, and check flight on Cheetah helicopter with the then chief pilot of the Company who was given one time approval by the DGCA. He was also given ground refresher by the AME. This training and assessment was in accordance with the DGCA "OPS Circular 2 of 2004" for period of absence from flying exceeding 12 months. This training also became the basis of the endorsement of Cheetah helicopter on his licence.

He first flew on Baltal- Sh. Amarnathji -Baltal sector on 12<sup>th</sup> June 2008 as Co-pilot. The pilot had more than 250hrs of hill flying experience (Acquired during flying in Indian Army from march 1995 to July 2002) before operating on this sector. No check flight with the examiner was carried out before operating as PIC on this sector/hill flying.

Proficiency check was carried out on 30<sup>th</sup> Jan 2008 and then in August 2008, the next became due on 29<sup>th</sup> Jan 2009 however it was carried out in 14<sup>th</sup> March 2009. Similarly Route Check was carried out 26<sup>th</sup> April 2008(entry not signed by the chief pilot who carried out the check), the next became due on 25<sup>th</sup> April 2009, however the same was carried out on 15<sup>th</sup> June 2009 on Baltal-Sh. Amarnathji Helipad Baltal Sector. Although annual recurrent training was carried out depending up on the availability of RWSI course however initial Human factor/CRM course was not carried out.

#### Details of Indian Licence

License type	:	Commercial Pilot's License (Helicopter)
Valid up to	:	15.07.2014
Date of Issue	:	16.07.2004
RTR Valid up to	:	15.07.2014
Date of Last medical Check	:	26.05.2009, Valid up to 26.11.2009

### **Aircraft Ratings**

As PIC : Chetak, SA315B Lama, Ecureuil-AS-350B-3  
Date of Endorsement : 04.07.2007  
on SA315B Lama (Cheetah)

### **Flying Details :**

Total Flying Experience : 2785:35 hrs  
Experience on type : PIC: 1199:40 hrs. ; Co-pilot: 469:35 hrs;  
U/T: 88:50 hrs; Co-Pilot (U/S): 2:35hrs.  
Total: 1760:40 Hrs  
(U/T – Under Training, U/S – Under Supervision)  
Flying during Last One year : Day: PIC 363:50 hrs. ; Co-Pilot: 32:10;  
Co-Pilot (U/S): 1:50 Hrs. U/T: 5:05 hrs.  
Total: 402:55 hrs.  
Flying during Last 30 days : 57:10 hrs.  
Flying during last 7 days : 15:00 hrs.  
During last 24 hours : 2:50 hrs

## **1.5.2 Aircraft Maintenance Engineer**

The Aircraft Maintenance Engineer is holding a BAMEL in Category 'A' & 'C'. He has been issued an authorization by Mesco Airlines Ltd. on 14.03.2009 which is valid up to 13.03.2010. The authorization is to carryout and certify pre-flight/transit and last flight inspections on Chetak SA316B and Cheetah SA315B helicopter fitted with Artouse IIIB/B1 engines as per the approved inspection schedule.

## **1.6 Helicopter Information**

**1.6.1** The helicopter was initially assigned the registration VT-XPP on 11.01.2005. Its C of A was issued on the strength of export C o f A No.3716/04 dated November 11, 2004 by the Swiss Authorities, on 14.01.2005 valid till 10.11.2005. On 26.12.2005 it was assigned the registration VT-WEX while under the ownership of same operator viz. M/s Himalayan Heli Services.

Manufacturer	Eurocopter
Type	SA315B Lama
Constructors S.NO.	2679
Year of Manufacture	1986
Certificate of Airworthiness	No.2619, Valid up to 16.06.2010

Category	Normal
Sub Division	Passenger
Certificate of Registration	3210 dated 26.12.2005
Owner	M/s Himalayan Heli Services Pvt. Ltd. 104, 7, L.S.C. Madangir, New Delhi – 110 062
Minimum Crew Required	One
Maximum Authorised All Up Weight	1950 kg
Last Major Inspection	100 hrs./180 days approved Inspection on 05.07.2009 and CRS issued
Last Inspection	Last Flight Inspection Schedule on 8.07.2009
Air frame Hrs. Since New	9576:32 hrs.
Air frame Hrs. Since last C of A	12:25 hrs.
Aeromobile Station Licence No.	A-042/003-RLO(NR) valid up to 31.12.2009
<b>Engine</b>	
Manufacturer	Turbomeca, Tarnos, France
Type	Artouste – III B1
Serial No.	944
Hours Done Since New	3581 :05
TSO	754 :05
Last Inspection Carried Out	Last Flight Inspection Schedule on 8.07.2009
Last Major Inspection Carried out	100 hrs./180 days approved Inspection on 05.07.2009 and CRS issued
Average Fuel Consumption	During the month of July the average fuel consumption varied between 153 lt./hr. to 162 lt./hr.

**1.6.2** Maintenance of the helicopter including its engine, electrical, instrument and radio systems up to and including 800 hrs. / 4 years approved inspection schedules were under the quality control of M/s Mesco Airlines limited, IGI airport, New Delhi. The engineering team consisting of AME(s), Technicians are the employees of M/s Himalayan Heli services. 100 hrs. /180 days inspection was carried out at Baltal. Permission for the same was obtained from the Director of Airworthiness, Delhi Region.



### 1.6.3 Scrutiny of records

- No snag has been recorded during the last one year in the snag register.
- Engine Serial No.0944 was installed on this helicopter on 21.05.2009 along with all accessories at 9483:22 airframe hours and 632:20 TSO engine hours after removal from helicopter VT-ERR.
- 3200 hrs. /12 years major inspection on airframe was carried out at RUAG Aerospace EASA Part 145 approved organisation on 3<sup>rd</sup> June, 2008.

### 1.6.4 General Description

#### A. General

The ARTOUSTE III is a single shaft turbine engine with a forward reduction gear. It rotates at a nominal constant speed of 33500 r.p.m., i.e. 5864 r.p.m. at the output shaft.

It consists of essentially of:

- A co-axial reduction gear with two intermediate shafts and two reduction stages.
- An air intake casing, the rear part of which supports the accessory mounting flange.
- A compressor with one-axial stage and one-centrifugal stage compressor.
- An annular combustion chamber with centrifugal fuel injection.
- A direct flow three-stage turbine.
- An exhaust diffuser.

#### B. Engine Controls and Instruments

In flight, the engine and rotor speeds are automatically stabilized by the governor, acting, by means of a metering device, on the flow of fuel. The metering device opens and closes automatically as the helicopter rotor absorbs more or less power. Thus, the pilot has no need to take care of the engine handling once normal speed is attained – the governor is in control.

Two engine control levers are located on the control quadrant at the bottom of the control pedestal.

### **1.6.5 Load & Trim Sheet**

The seating arrangement in the Cabin was as follows:

- a) Passenger No.1-Copilot Seat
- b) Passenger No.2-Behind PIC
- c) Passenger No.3-Middle
- d) Passenger No.4-Behind Co-Pilot Seat

The load and trim sheet was prepared by the pilot for the first sortie and they were found to be within limits. Weight during accident flight was 1608 kg and C.G. position was at 2.82 m which are within the limits.

At pressure altitude of 12000ft and air temperature of 13°C the corresponding density altitude is 14400ft.

## **1.7 Meteorological information**

There is no observatory either at Baltal or Amarnath Cave. Weather estimation is done based upon visual observations and wind sock. The information is based on the details furnished by crew of other operators, pilot involved in accident and eye witness

### **1.7.1 Baltal Helipad**

at 06:15 IST, the weather at Baltal was clear with no clouds, visibility was 8 to 10 km and temperature was about 17° C. Winds at Baltal helipad were calm initially and became westerly 3 to 5 knots after about an hour.

### **1.7.2 Sh. Amarnathji Helipad**

Winds were initially calm with clear sky and visibility in the valley was 8 to 9 km, temperature at Amarnath Helipad was about 12 °C to 13 ° C. The sunlight was bright in the morning from 06:15IST to 07:00 IST with glare effect and sunshine on the helipad. During the 6<sup>th</sup> trip there was shadow on the Helipad and the left hill and glare effect had died down.

**The organisation does not maintain records of the weather observations.**

## **1.8 Aids to Navigation**

Navigation is by visual reference. No ground based navigation aid is available.

## **1.9 Communication**

As per the coordination procedure between different helicopter operators on the route, the helicopters flying in the valley give calls at established reporting position: “Echo”, “Delta”, “Gorge” and at “Sangam” at frequency 127.9 MHZ. There is no ground based radio communication system. Helicopter VT-WEX gave RT calls at (“Echo”, “Delta”, “Gorge” and “Sangam”). At approx. 07:25 IST another helicopter VT-DAS flying to Amarnath Helipad reported position at “Sangam” but there was no response from the helicopter VT-WEX who was ahead of it.

## **1.10 Helipad information**

### **1.10.1 Sh. Amarnathji Helipad**

Sh. Amarnathji helipad is located at latitude of 34° 12’55” North and Longitude 75° 30’40” East is about 45 minutes of helicopter flying time from Srinagar. Most of the flight path is routed through valleys with mountain ranges on either side. Sh. Amarnathji helipad is at about 12000 feet AMSL and is located at end of the valley through which the flight progresses narrow valley turning back or going around is not possible at Shri Amarnathji. Helicopter shall not carry out a final approach and landing in tail winds.

### **1.10.2 Baltal Helipad**

Baltal helipad is at 9000 ft. (approx) AMSL and it is located at Latitude of 34° 15.456’ North and Longitude: 75° 24.749’ East.

**1.10.3** Both the helipads are for day VFR operations. Wind sock and flags have been installed for visual aids.

### **1.10.4 Rescue and Fire Fighting Services**

Fire capacity of H1 category is maintained. At Baltal, a fire tender is present at all time.

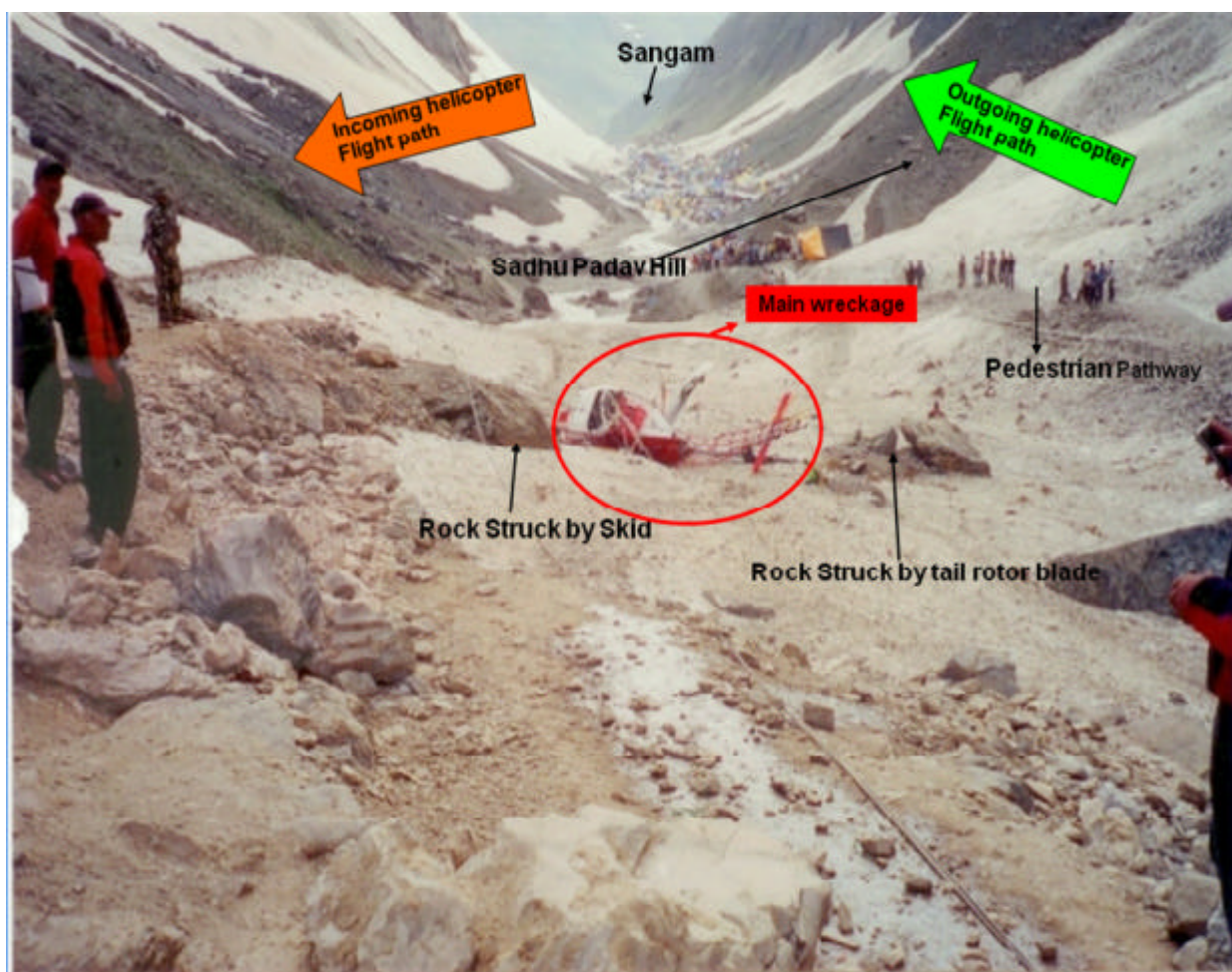
Himalayan Heli Services has made an emergency response plan and the same has been reflected in their SOP approved by regulatory authority.

## **1.11 Flight recorders**

The helicopter is not equipped with the CVR and FDR, neither they are required.

## 1.12 Wreckage and Impact Information

Accident site is at an altitude of 11700 feet and at a distance of 500 meters from the Sh. Amarnathji helipad. The coordinates of the accident site are Latitude: N 34°12'55" Longitude: E 75°30'40". Accident site is a sloping glacier/hard snow at the bottom of the narrow Sh. Amarnathji Valley.



At around 500mts downstream of the Sh. Amarnathji helipad, helicopter carried out continuous right turn across the width of the valley. In the process it passed over a hill (Sadhu Parao) of height **11800 ft.** on the left side (out going route) of the valley and then while entering the valley again, its skid hit a female pilgrim standing on the pedestrian pathway flanking the valley and leading to the cave, at the back of her head (Lower occipital region). Thereafter it entered the valley in nose up attitude. In the process, the tail rotor and aft portion of tail boom of the helicopter hit the ridge/ stone as evident from the chipping of the rock. Due to the

impact the tail rotor separated along with the hub assembly. Due to loss of tail rotor the directional control was lost and helicopter went into spin. In the process the left skid of the helicopter hit one of the rocks and toppled over to the right side. This is indicated by impact marks on the rock and damage noticed on the skid and fuselage bottom portion. There was not much spread of the wreckage.

Before the point of first impact no aircraft part/component was recovered along the direction of flight. There was no fire.

### **1.12.1 Cockpit**

a) The cockpit frame was attached to the body structure. All the Plexiglas had shattered. Pilot and co pilot door frames were intact. All seat belts and pilot harness were intact and no seat was dislodged. Cyclic sticks intact however bend at the curvature. Floor of the cockpit was folded due to compression loads and elongation of holes was seen at the attachment points of the skids. Battery was intact and connections engaged.

#### **b) Position of switches and Circuit Breakers**

Radio and intercom switches “off,” battery switch “off.” Mirror switch “on”,

fan switch “on”, external light “on”, booster pump “on”, Engine starting switch “on”. All C.B`s “in”. Fuel shut off valve in “on” position and wire locked, Fuel flow lever fully forward. All instruments were intact, collective pitch indicator glass broken & needle stuck at “0.8” collective.

### **1.12.2 Fuselage**

a) Body structure was intact. Vertical and longitudinal members on left hand side were broken. Rear panels on body structure were intact and members were in satisfactory condition. Left hand attachment of the body structure to the floor was separated and members had broken. Cabin floor had separated at attachment point to the body structure. Grazing marks were observed on the outer skin of forward portion. Mixing unit was attached to the body structure. Pitot tube had separated from the attachment. VHF antenna was intact

- b) A tank attachment cable on left side was found to be in satisfactory condition and front cable on right side was broken. Tank was dented on bottom, booster pump was intact. Connections leading to booster pump were intact, connection leading to pressure switch had broken.
- c) MGB platform was attached to the fuselage. MGB platform bell crank assembly was intact; controls were attached and bell crank was moving freely.
- d) Tail rotor control quadrant was attached to the body structure

### **1.12.3 Engine**

Engine had separated from the mounting. Front left and right mounts and rear mount had broken. Right intake grid had separated. Exhaust had separated and found 3feets away from the main wreckage and bore impact marks. Connections leading to oil filter and pressure switches were intact. Clutch engaged to the engine and rotating freely. Freewheel shaft had separated from the attachments to the clutch and MGB drive. Freewheel rotating freely in one direction and engaged in the other direction. Oil pipeline connection leading to the oil tank had separated. Fuel supply line connection from the filter was found intact.

### **1.12.4 Main Gear Box, Rotor Mast, Main Rotor head & Blades**

- a) Main gear box (MGB) was attached with the platform. `A` frame on right side was intact, however left side front frame was found broken. All connections of controls to the MGB were intact and secured. MGB hydraulic pump and pipelines were intact. Rotor brake assembly was attached to MGB. Inclined drive shaft was attached to the MGB. Main rotor mast was attached to the MGB. Oil connections to the main rotor mast were satisfactory. Main rotor head was attached with the main rotor mast.
- b) Yellow pitch link and sleeve intact and was in good condition. Blue and red pitch links were broken. Red pitch link horn broken and red sleeve had bent. Blue and red sleeves dragged out. Yellow and blue pitch horns were intact. Drag dampers were intact, however blue and red blade drag dampers sight gauge broken. Droop restrainer was intact, however attachment point near red sleeve broken. Spacing cables had separated from the end attachment on the sleeves. Two spacing cables

were attached to red sleeve and broken from other end. Scissor assemblies intact, both rotating and non rotating. Fore and aft control leading to Swash plate was intact. Lateral control rods had broken.

- c) All the three blades had delaminated. Blue and red blade tips separated, yellow blade tip intact. Blades were attached to the sleeves.
- d) Free wheel shaft had separated from attachment.

### **1.12.5 Tail Rotor Assembly**

Tail gearbox along with tail rotor head and blades had separated at the attachment point to the tail boom. The rotor assembly was recovered 5 feet away from the main wreckage near a rock. Pitch change links were attached to the tail rotor head.

Spider assembly was intact. Control drum was intact. Gear box attachment gears to the tail rotor drive shaft found satisfactory. Gearbox had separated from the tail rotor drive shaft gear attachment. Tail rotor blades were attached to the tail rotor head. All the blades were flapping and pitch change link moved freely. All the three tail rotor blades had cut off at identical distance from the root. Tail rotor drive shaft was intact, however shaft shifted to the rear. All bearings were intact and locked.

### **1.12.6 Tail Boom**

Tail boom had detached from left side and at rear attachment to the body structure. It was bent in a curvature due to impact at rear most point at the bottom. Tail drive shaft was attached to the tail boom. Tail rotor controls were intact to the tail boom, pulleys intact, cable intact. Tail rotor guard and two attachments on left and right side had broken. Horizontal stabilizer was attached to the tail boom. Horizontal stabilizer tip on left hand side was bent.

### **1.12.7 Landing Gears**

Right side skid was intact, however vertical members to cross tube had broken. Left side skid had broken in the middle. Right side front damper assembly had separated from body structure.

### **1.13 Medical and Pathological Information**

Two of the passengers had no visible injuries. Pilot and two other passengers had lacerated wounds and fracture of limbs. The pilgrim had 7 cm cut in the occipital region of the head.

### **1.14 Fire**

There was no fire.

### **1.15 Survival Aspects**

Pilot suffered serious injury due to toppling over of the helicopter on the right side. Only one passenger sitting on the right side suffered serious injuries. The helicopter fuselage shell was intact. A pilgrim on the pedestrian road on the left flank of the valley was fatally injured due to the skid of the helicopter. The accident was survivable. The crew and the passengers were evacuated to medical camp by security forces and civilians. After giving first aid and necessary medical treatment the injured were dispatched to Base Camp Baltal for further treatment, by the helicopters of Himalayan Heli Services and Deccan Helicopters.

### **1.16 Tests and Research**

#### **1.16.1 Fuel Sample Report**

A sample of fuel of the same batch as was used on the aircraft was obtained and subjected to full specification test at the Fuel Lab in the O/o Directorate General of Civil Aviation (DGCA). As per the examination, report received there was no abnormality in the sample and it passed all the specification tests.

#### **1.16.2 Boroscope Inspection of Engine**



Engine was transported from the accident site to the facilities of M/s Himalayan Heli Services in New Delhi. A Boroscope inspection of the engine ESN: 0944 involved in the accident was carried out in association with the representative of Turbomeca. During the Boroscope Inspection no anomaly which could explain the loss of power was noticed. The detailed observation was as follows:

### **EXTERIOR CONDITION**

External Impacts noticed with presence of dust & sand particles, due to Impact.

### **AXIAL COMPRESSOR & INLET PATH**

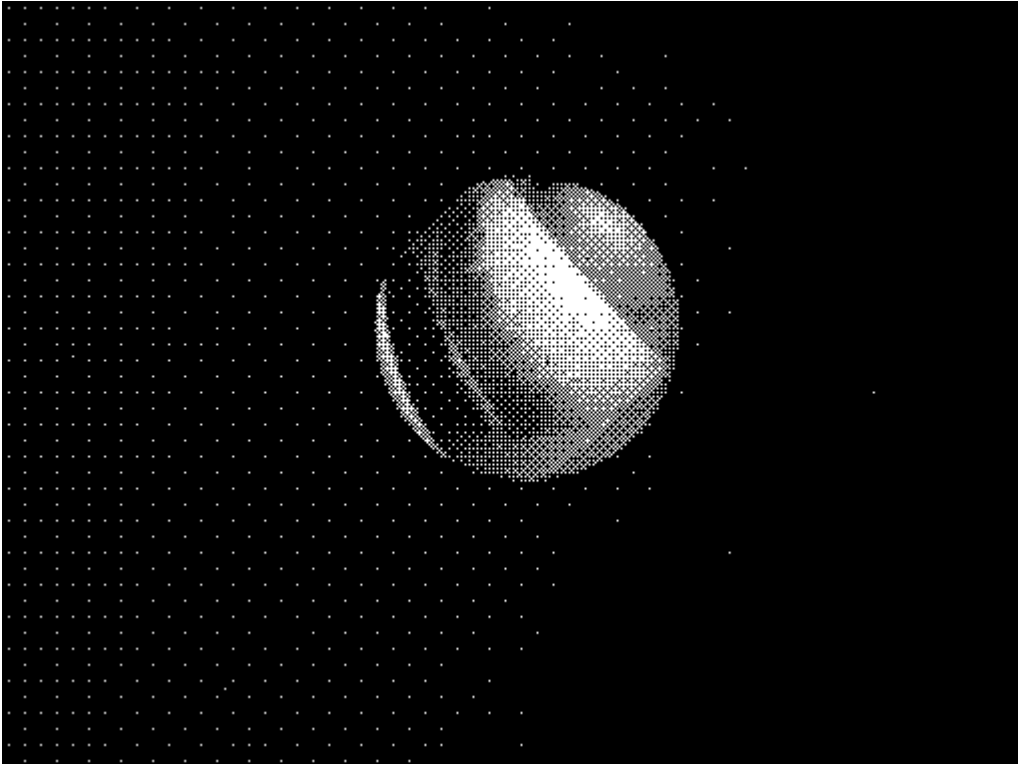
- Found dirty, black with oil presence due to impact, tiny particles of dislodged epoxy from inlet port found in entry area
- No Foreign Object Damage or significant damages
- No sign of erosion on blades' leading edge
- Blades' profile smooth
- Presence of oil with dirt (black) in the compressor casing.



### **CENTRIFUGAL COMPRESSOR**

- Oil with dirt noticed
- No sign of damage or visible erosion noticed at blades leading edge & profile area
- Oil with dirt noticed at compressor hub area
- No sign of rubbing at impeller shroud & exducer path

- No erosion or damage noticed on the diffuser entry



### **COMBUSTION CHAMBER**

- No overheat evidence noticed
- No Cracks, hot spots, bulging noticed
- General condition of combustion chamber satisfactory
- Sand and dust (possibly collected by its post impact position on floor) noticed in the turbine casing

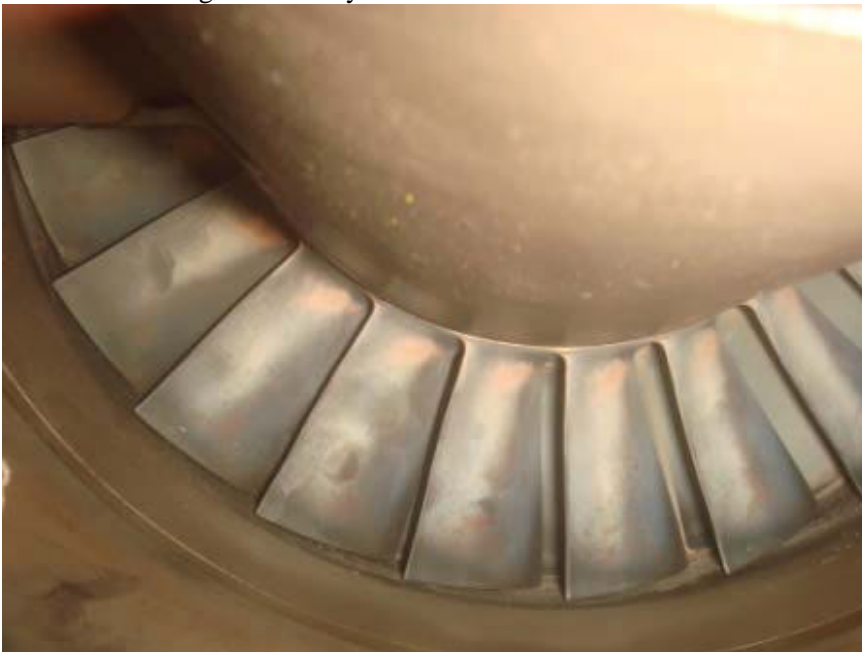


**NOZZLE GUIDE VANE**

No anomaly noticed.

**1<sup>ST</sup>, 2<sup>ND</sup> & 3<sup>RD</sup> STAGE TURBINE**

No damage or anomaly noticed.



### 1.16.3 Inspection of Fuel Pump and Fuel Governor

Fuel pump with part no. 0044495060, S.No. F103E and a Speed Governor Part No. 0064395030, S.No. 2514 was tested at TURBOMECA TARNOS SAFRAN Group France. The test result was found to be compliant with Turbomeca's technical specifications. No discrepancy that could explain the power loss reported by the Pilot was found. Observations made during the testing of the parts are as follows:

#### 1.16.3.1 External Observations:

(a) *Fuel Pump S.No. F103E*

- Two warranty seals were missing.
- Fuel lever found to be bent. The fuel lever cannot complete its angular range because of the deformation (which is consecutive to the accident).The lever is stopped by the pump body.
- Free rotation of the drive shaft.

c) *Speed Governor S.No. 2514*

- All warrant seals were present.
- Light stiff point upon manual rotation of the drive shaft
- A mixture of grease and very fine particles (which seem to be non metallic) were detected on the shaft splines on removing the drive shaft for installing the governor on the test rig.

#### 1.16.3.2 Findings on Test Rig:

*Functional Check:*

To complete the maximum angular range of the fuel lever on the fuel pump, the fuel lever was moved backwards (axial displacement of 3mm).this displacement has no effect on the setting and operation of the pump.

Max fuel flow check	345 liters for 330 $\pm$ 3 liters
Max speed check	3,774 rpm at 200 liters for 3,769 $\pm$ 3 rpm 3,774 rpm at 280 liters for 3,769 $\pm$ 3 rpm
Mini fuel flow check	3 successive tests carried out: 43.5 liters- 46 liters and 49 liters for 48 $\pm$ 2 liters.
Oil pressure check	795 kPa (750 $\pm$ 100 kPa)

- During the test a slight fuel leak was observed between the fuel pump crossing nut and blind nut.

- Particles observed to be non metallic were found within the test rig filter.

#### **1.16.4 Inspection of Instruments**

Air Speed indicator S.No.296/90 and altimeter S.No.01677 were subjected to bench check at M/s Vikram Aviation Pvt. Ltd. Both the instruments were found within the tolerance limit. For altimeter at 12,000 ft. the tolerance limit is 90 ft.

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

**1.17.1** M/s Himalayan Heli Services Pvt. Ltd. (HHSPL) is a Non-scheduled Air Transport Operator engaged in helicopter charters from its main base at I.G.I. Airport, New Delhi. HHSPL was granted the NSOP No.1/2002 in January 2002. HHSPL was incorporated with a focus on marketing Helicopter based Tourism such as Heli-Trekking, Heli-Safari, Heli-underslaung operation and sport of heli-skiing and Amarnath Yatra.

The organisation is headed by Board of Directors. The organisation has made Operation Manual and Operators Maintenance Control Manual for the guidance of its personnel. As per the Operation Manual the post of Chief Pilot is still vacant. The operation manual does not lay down the qualification and experience requirements for the chief pilot.

For operation to Shri Amarnathji Shrine, a Standard Operating Procedure has been made which contains information regarding operations, safety practices, maintenance and emergency response plan in case of any accident. However, neither Operation Manual nor SOP speaks about the organisation set-up and monitoring of activities at detachments. For this operation the pilot involved in the accident was declared as the chief pilot on adhoc basis. However neither the operation manual nor the SOP mentions about the qualification and experience requirement, duties and functions of the chief pilot of the detachment. The SOP does not mentions the following among others

- (1) Altimeter setting for pressure altitude.
- (2) Approach procedure for the Sh. Amarnath ji helipad
- (3) Does not contain details of the operational information to be preserved.
- (4) Details of different reporting points.
- (5) Procedure to be followed in the case of aborted landing.

For Sh. Amarnathji operation SOP prescribes the crew qualification as

“A pilot having minimum 2000 hrs. of flying experience with a minimum of 250 hrs. of previous hill flying and 100 hrs. on the type with 500 hrs. of PIC experience will be employed for purpose on single pilot operation. Such a pilot will fly under supervision of the chief pilot till such time the chief pilot clears this pilot on Srinagar, Shri Amarnathji, Srinagar Sector.”

### **1.17.2 Flight Safety and Surveillance of Activities**

Organisation has an Advisor flight Safety to oversee the company safety programme and also a Flight Safety Officer. The pilot involved in the accident is also the Flight Safety officer of the organisation. During the operation there has been no violation of the FDTL. Organisation has not maintained any written record of inspections/ surveillance activities carried out during the operation.

### **1.18 Additional information**

NIL

### **1.19 Useful and Effective Investigation Techniques**

N/A

## **2. ANALYSIS**

### **2.1 Airworthiness of Aircraft**

#### **2.1.1 Maintenance of Aircraft**

The Certificate of Airworthiness of the aircraft was current and valid. Periodicity of all scheduled maintenance task were maintained. As per the available records no snag was reported during the C of A inspection and during last one year.

#### **2.1.2 Serviceability of Engine**

Crew experienced sudden sink during landing at Sh. Amarnathji helipad and was not able to recover from it. Crew used full collective to recover. Depending on ambient temperature and altitude the density altitude was 14400 ft. At this density altitude as per the performance curves there is sufficient power margin available. Despite the use of full collective the recovery could not be made.

At the accident site Engine was examined. Compressor was rotating freely without any unusual noise .Free turbine and power turbine were rotating freely, no sign of flame out or black deposit was observed. Inlets and exhaust of the engine were found to be clean. No particles found in the oil filter and magnetic chip detectors .All pipelines to fuel and oil system found intact. All electrical connections were found intact. Connection to EFC, Fuel Pump, and Governor

found intact. Constant speed governor was checked and no shearing of shaft detected. Fuel tank and vent was checked and found in satisfactory condition.

Therefore it was decided to carryout the boroscope inspection of the engine. During the Boroscope Inspection no anomaly which could explain the loss of power was noticed.

Further to isolate the failure of fuel pump and fuel governor they were subjected to the bench check at the manufacturer facility. A slight fuel leak was observed between fuel pump crossing nut and blind nut.. However the depending on the quantity of leak observed it cannot be the source of the power loss.

Thus it can be safely concluded that engine and its related system were functioning satisfactorily at the time of the accident and there was no power loss.

- 2.1.3** The aircraft was maintained as per the approved maintenance programme. No snag was reported before the accidental flight. All the aircraft systems were checked after the crash and no abnormality was observed. Thus it can be safely concluded that the aircraft was in airworthy condition to undertake the flight.

## **2.2 Crew Qualification and Proficiency**

### **2.2.1 Crew Qualification**

The crew held valid license and is qualified on type. As he did not fly for two years after relinquishing the services with Indian Army, at the time of joining Himalayan Heli Services, he underwent familiarization flying training, ground refresher and assessment on Cheetah helicopter in accordance with the DGCA “OPS Circular 2 of 2004” for period of absence from flying exceeding 12 months. This training and the assessment also was the basis for the endorsing Lama Type Helicopter on his License.

CAR Section 7 Series B Part XIV requires as under

#### ***2.1 Competency Checks***

***a) Proficiency Checks.*** All pilots engaged in commercial operations carrying passengers shall undergo proficiency checks covering aspects as applicable for type of helicopter and operator’s role. The proficiency check will be carried out by DGCA approved examiner twice in a year with not less than four months and not more than eight months between any two checks.

***b) Route/Line/LOFT Check.*** These checks will be carried out once a year to cover exercises as applicable to the type of helicopter(s).

- Proficiency check was carried out on 30<sup>th</sup> Jan 2008 and then in August 2008, the next became due on 29<sup>th</sup> Jan 2009 however it was carried out in 14<sup>th</sup> March 2009.
- Route Check was carried out on 26<sup>th</sup> April 2008(entry not signed by the chief pilot who carried out the check), the next became due on 25<sup>th</sup> April 2009, however the same was carried out on 15<sup>th</sup> June 2009 on Baltal-Sh. Amarnathji Helipad Baltal Sector.
- Although annual recurrent training was carried out depending up on the availability of RWSI course however initial Human factor/CRM course was not carried out.

Thus there is discrepancy in the currency of the licence of the pilot.

### 2.2.2 Hill Flying

He first flew on Baltal- Sh. Amarnathji -Baltal sector on 12<sup>th</sup> June 2008 as Co-pilot. The pilot had more than 250hrs of hill flying experience (acquired during flying in Indian Army from March 1995 to July 2002) before operating on this sector he had 2000 hours of total flying experience. No check flight with the examiner was carried out before operating as PIC on this sector/hill flying.

As per CAR Section 7, Series 'B', Part XII, a pilot having at least 250 hrs of hill flying experience on helicopter is considered experienced in hilly operation. Para 3 of the regulation further requires as under

### 3. TRAINING / EXPERIENCE REQUIREMENTS

3.1 *Pilots engaged in regular / irregular operations in the hilly area shall undergo Training as given below:*

a) *Pilot having no previous experience of hill flying shall be imparted special Training specific to hill operations prior to operate from copilot seat for such Operations.*

b) *Pilots having hill flying experience but no experience in the area of intended Operations may fly from co pilot seat for area familiarization.*

c) *Pilot shall be checked by an examiner before he is cleared to operate as PIC.*

d) *The special training specific to hill operations to be conducted at DGCA approved training school is given in Appendix A.*

Company's Operations manual Para states that even if pilot possesses 250 hrs of hill flying experience

As per HHSPL Flight Operations Manual:



*Pilots having previous experience in hill flying and with more than 250 hrs. on type shall operate in the hilly area after a check flight with an examiner or alternatively carry out trial run / landing before operating a flight with passengers on board.*

### *10.2.3 Crew Qualifications*

*Route Qualifications – The PIC before operating the flight for the first time to hilly terrain should have flown minimum of two flights to and from the airfield as second pilot or on familiarization flights with other pilots who have experience of flying to that airport or area. There after he should have undergone one satisfactory route check with an Examiner or senior experienced pilot approved by the DGCA.*

*Type Qualifications – The Pilot operating flight to / from airfields surrounded by hilly terrain should be specifically checked and cleared on the type of aircraft for each airfield for such operations before operating independently.*

Though he carried out the familiarization flight for the route, however he commenced the hill operation without undergoing a check flight with the examiner. Therefore, in violation of the company's operations manual the crew was permitted for hill operation. Further he did not undergo initial ground training course on hill flying as required. This indicates lack of knowledge/disregard to the rules by the PIC and supervisory staff.

## **2.3 Approach to Sh. Amarnathji Helipad**

During the sixth sortie as per the procedure, the helicopter flew along the right side of the valley. At Sangam, it was about 12100ft. to 12200 ft. and indicated speed was 60kts. Between Camp 1 and Camp 2 in Sh. Amarnathji valley Pilot started deceleration. In the valley, as there was no other traffic ahead of it; returning back or at helipad, Pilot flew the helicopter almost near the center of the valley on the right side.

He made a straight in approach for the Himalayan Heli Services helipad. After camp 2, he made a gradual left turn of 10° to 20° to left to maintain the perspective and the perspective was slightly **steep**. His corrective pitch margin was 0.85% till commencement of the approach, thereafter it was reducing during deceleration. The total weight of the helicopter was 1608kgs with the corresponding density altitude of 14400 ft. This is with in the weight at the OGE hover at Sh. Amarnathji Helipad. On the short finals of the approach, he felt the helicopter was sinking with a high rate of descent. He pulled full collective to get a quick recovery and took a right turn.

Himalayan Heli services Ground handling in charge at Sh. Amarnathji helipad who was positioned at helipad to marshal the helicopter and other eyewitnesses observed the approach of helicopter to be normal and almost along the center of the valley but helicopter was at higher altitude than the normal. Over head the helipad, the helicopter made a turn to align for landing at helipad. Immediately thereafter helicopter experienced loss of lift and descended below the helipad level short of helipad and then made a turn towards right (incoming route).

### **2.3.1 Approach to the Helipad**

**Flight In and Along Narrow Valleys** (Ref. MHS Aviation Sdn. Bhd., Malaysia Operations Manual Para 3.3.6)

*Flight along a narrow valley may bring together a number of unfavorable flight conditions e.g.*

- 1. The absence of any normal horizon.*
- 2. The accentuation of funnel effect and, if the valley is climbing, that of slope also.*
- 3. A limitation of action available to the pilot in the event of an emergency.*

*Unless prevented from doing so for operational reasons, the pilot should always fly down a valley towards its exit and low ground. When flying up a valley there is always the danger of flying past the point at which an 180° turn is possible and beyond which the valley is climbing at a rate higher than that of which the aircraft is capable. The following points may help pilots:-*

- 1. Avoid flying along the centre of a valley but stay on the “lifting” side.*
- 2. When flying up a valley do not pass the last point at which a 180° turn is possible unless you know that an exit exists beyond.*
- 3. Fly down rather than up a valley whenever possible.*
- 4. Pay frequent reference to flight instruments especially the ASI in order to maintain correct and safe flight conditions.*
- 5. Always turn away in good time and make the turn away from the nearest slope.*

The Pilot flew almost along the center line of the valley which he should have avoided. The helipad and the left hill were in shade.

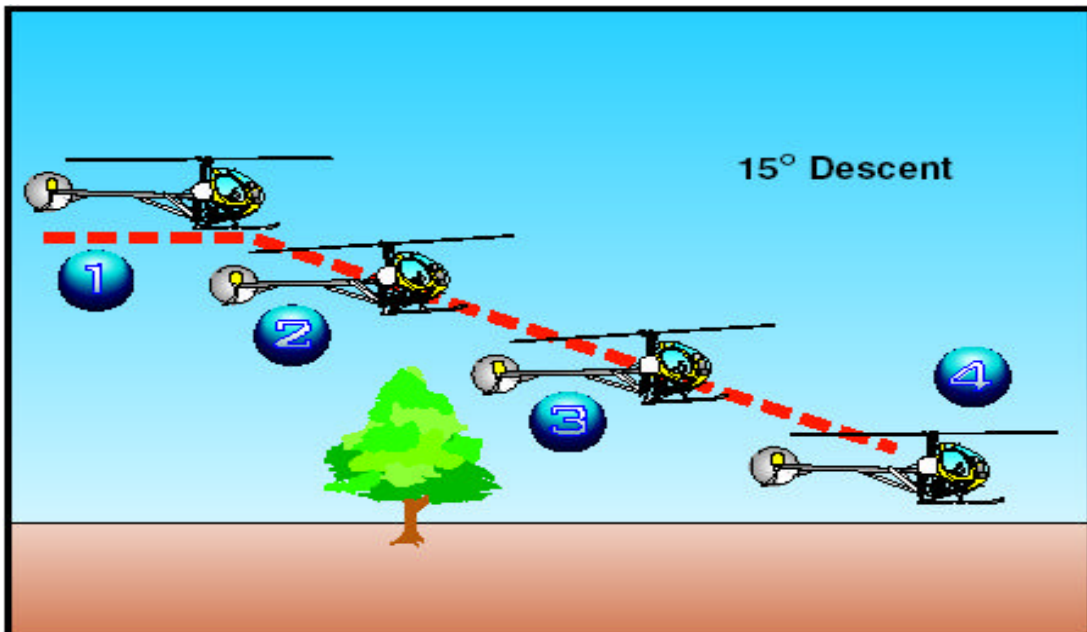
### **2.3.2 Final Approach and Landing at the Helipad**

An approach is the transition from traffic pattern altitude to either a hover or to the surface. Approach should terminate at the hover altitude with the rate of descent and ground speed reaching zero at the same time. At Sh. Amarnathji helipad, due to narrow valley and high altitude of the helipad, shallow approach is preferred.

(Ref. FAA Rotor Craft Flying hand Book): *On the final approach, and at recommended approach speed, align the helicopter with the point of intended touch down. Turn to the final should be planned so that the helicopter rolls out on an imaginary extension of the centerline for the final approach path. This path should neither angle to the landing area on the left, nor require an S-turn on the right.*

**Technique of Steep Approach:**

*When you intercept an approach angle of 15°, begin the approach by lowering the collective sufficiently to start the helicopter descending down the approach path and decelerating (Position 2). Use the proper antitorque pedal for trim. Since this angle is steeper than the normal approach angle, you need to reduce the collective more than that required for the normal approach. Continue to decelerate with slight aft cyclic, and smoothly lower the collective to maintain the approach angle. As in a normal approach, reference the touchdown point on the windshield to determine changes in approach angle. This point is in a lower position than a normal approach. Aft cyclic is required to decelerate sooner than a normal approach and the rate of closure becomes apparent at a higher altitude. Maintain the approach angle and rate of descent with the collective, rate of closure with the cyclic, and trim with antitorque pedals. Use a crab above 50 feet and a slip below 50 feet for any cross wind that might be present.*



*Loss of effective translational lift occurs higher in a steep approach (Position 3 of the fig), requiring an increase in the collective to prevent the settling, and more forward cyclic to achieve the proper rate of closure. Terminating the approach at hovering altitude above the intended landing point with zero ground*

*speed (Position 4). If power has been properly applied during the final portion of the approach, very little additional power is required in the hover.*

The pilot was flying almost in the middle of the valley and approached the landing site at an angle from the left. His altitude was higher than the normal approaches. In other words he was making a steeper approach. The pilot was used to a procedure where in during the approach the collective is continuously reduced during deceleration and on terminating the approach at hovering altitude above the intended landing point raise the collective once again between 0.80 and 0.90. The sudden sink experienced by the pilot was at the Position 3 of the figure, before which he should have raised the collective.

Further during the turning flight, the rotor disc is tilted sideways resulting in lift being separated into two components - Vertical component of lift and horizontal component of the lift (As the angle of bank increases, the total lift force is tilted more towards the horizontal. This causes the rate of turn to increase because more lift is acting horizontally, the effect of the lift acting vertically is decreased). To compensate for this decreased vertical lift, the angle of attack of rotor blade must be increased in order to maintain altitude. As per the eyewitness and the ground handling incharge, helicopter made sudden turn to align with the helipad and immediately thereafter the sinking of the helicopter was experienced. The turn executed by the pilot during the final approach may have also led to decrease of the lift and sudden sinking of the helicopter.

Thus the technique applied by the pilot during the final approach was not correct.

## **2.4 Sequence of Events**

On 09 July 2009 Himalayan Heli Services SA315 B Lama Helicopter VT-WEX was engaged in the carriage of the pilgrims from Baltal Helipad to Cave Helipad for the darshan of Sh. Amarnathji and back. It started the operation at 6:05 IST and had made five trips. During the Sixth trip, the helicopter took off at around 07:20 IST from Baltal helipad with 04 Passengers and one pilot crew member. While landing at cave helipad helicopter experienced sudden sink it turned around, flew down in the valley and crashed at 500 meters away from the cave helipad at 07:30 IST.

On 9<sup>th</sup> July, 2009 the preflight inspection as per the approved schedule was carried out by the BAMEL Holder who was issued authorization and no snag was observed by him. The total fuel was 300lts at the start of operation on the day.

At 06:05 IST the helicopter took off for the first trip after inspection by the pilot. He subsequently carried out four more trips without switching off the engine at either of the helipad and no snag was observed by him. At 07:20 hrs. (approx.) with total of 4 passengers on board and 130 liters of fuel, he took off from Baltal for the sixth trip. As per him there was no snag or any abnormality in the take-off. During the flight, as per the procedure helicopter flew along the right side of the

valley, viewed from Sangam and made call at the designated reporting points "Echo", "Delta", "Gorge" and "Sangam". Thereafter, he entered Amarnath Ji Valley at an altitude of 12100 feet. In the valley, as there was no other traffic ahead of it, returning back or at the helipad, he flew almost near the center of the valley on the right side.

He made a straight in approach for the Himalayan Heli Services helipad. He was slightly higher than the normal approaches, in other words the approach was steeper than the normal approaches. His collective pitch margin was 0.85% till commencement of the approach, thereafter it was reducing during deceleration. On the short finals of the approach, the helicopter made a turn from left to align for landing. Immediately thereafter helicopter experienced loss of lift and descended below the helipad level short of helipad i.e. he felt the helicopter sinking with a high rate of descent. He pulled full collective to get a quick recovery and took a right turn. At short distance up stream of the helipad there is hill/glacier which blocks the mouth of the valley.

Due to small area for maneuvering, the Organisation SOP states "***Turning back or going around is not possible at Shri Amarnathji. Helicopter shall not carry out a final approach and landing in tail winds. There are three helipads, one is always kept vacant for emergency.***"

Further, Flight Manual of Lama Helicopter Para 13- Places Restrictions on harsh manoeuvres such as sharp turn and rapid manoeuvres.

However, the helicopter turned back and did not attempt a landing at the third helipad (BSF Helipad) further upstream of the Himalayan Helipad.

He tried to build up speed to gain transition lift. He was now flying on the right side of the valley as viewed from the Sangam. After executing right turn the helicopter climbed to about 12030ft.i.e. it gained lift. Around this point of time the crew of other helicopter gave calls to VT-WEX. However VT-WEX did not respond. He was flying at a speed of 50 knots and 0.95% collective. He decided to make an emergency landing in the middle of the valley instead of going forward to avoid hitting the tents further down the valley. Accordingly, at around 500mts downstream of the cave helipad, he turned 180 ° right across the width of the valley and in the process it passed over a hill (Sadhu Padav) of height **11800 ft.** on the left side(out going route) of the valley. Since the width of the valley is small making a right tight turn in the valley may have led to further loss of the lift. He initiated flaring to check the speed.

While approaching the valley from the Sadhu Padav hill, the skid of the helicopter hit a female pilgrim on the pedestrian road flanking the valley leading to the cave, at the back of her head (Lower occipital region) and she died. Thereafter helicopter approached the accident site in a pitch up attitude. The tail rotor impacted the ridge/ stone in almost the middle of the valley and due to impact the tail rotor separated. Due to loss of tail rotor the directional control

was lost and helicopter went into spin. In the process the forward portion of left skid of the helicopter hit the one of the rock. The helicopter toppled on the right side and came to rest.

## **2.5 Management Aspect**

**2.5.1** The organisation has made Operation Manual and Operators Maintenance Control Manual for the guidance of its personnel. As per the Operation Manual the post of Chief Pilot is still vacant. The operation manual does not lay down the qualification and experience requirements for the Chief Pilot.

For operation to Shri Amarnathji Shrine, a Standard Operating Procedure has been made which contains information regarding operations, safety practices, maintenance and emergency response plan in case of any accident. However, neither Operation Manual nor SOP speaks about the organisation set-up and monitoring of activities at detachments. For this operation the pilot involved in the accident was declared as the chief pilot on adhoc basis. However neither the operation manual nor the SOP mentions about the qualification and experience requirement, duties and functions of the chief pilot of the detachment. The SOP does not mentions the following among others

- Altimeter setting reference for pressure altitude.
- Approach procedure for the Sh. Amarnathji Helipad
- Procedure to be followed in case of aborted landing
- The reporting points

### **2.5.2 Surveillance of Activities and Compliance of Organisation SOP**

Organisation has an Advisor flight Safety to oversee the company safety programme and also a Flight Safety Officer. The pilot involved in the accident is also the Flight Safety officer of the organisation. During the operation there has been no violation of the FDTL. Organisation has not maintained any written record of inspections/ surveillance activities carried out during the operation.

The training record of the crew shows that the monitoring of the crew qualification was not strictly enforced. The SOP does not permit turning back or going around at Sh. Amarnathji helipad. In violation of the Organisation SOP, the pilot, after aborting landing turned back instead of proceeding to the third helipad upstream of it. This indicates that the crew is engaged in the routine flight activity and never discuss or practice the possible emergencies which can be encountered.

There is need for the company to strengthen its flight safety/surveillance programme.

### **3. CONCLUSIONS**

#### **3.1 Findings:**

- 3.1.1 The Helicopter was maintained as per the approved maintenance programme. No snag was reported before the accidental flight. All the helicopter systems were checked after the crash and no abnormality was observed. Thus the helicopter was in airworthy condition to undertake the flight.
- 3.1.2 Pilot has valid endorsement on the type of the helicopter
- 3.1.3 Following are the discrepancy in the currency of the licence of the pilot
  - 3.1.3.1 Proficiency check was carried out on 30<sup>th</sup> Jan 2008 and then in August 2008, the next became due on 29<sup>th</sup> Jan 2009 however it was carried out in 14<sup>th</sup> March 2009.
  - 3.1.3.2 Route Check was carried out 26<sup>th</sup> April 2008 (entry not signed by the chief pilot who carried out the check), the next became due on 25<sup>th</sup> April 2009, however the same was carried out on 15<sup>th</sup> June 2009 on Baltal-Sh. Amarnathji Helipad Baltal Sector.
  - 3.1.3.3 Although annual recurrent training was carried out depending up on the availability of RWSI course however initial Human factor/CRM course was not carried out.
- 3.1.4 Pilot operated to Sh. Amarnathji Helipad without undergoing check flight with the examiner.
- 3.1.5 Organisation does not have robust system of monitoring the crew qualification vis-à-vis the regulatory requirements and company's own requirements.
- 3.1.6 Pilot employed incorrect procedure of flying along the centerline of the valley.
- 3.1.7 Pilot employed incorrect technique for the steep approach
- 3.1.8 Pilot carried out 180° turn in the narrow valley which further led to the loss of the lift and in the process skid of the helicopter hit a pilgrim on the head causing her death and subsequent crash landing in the middle of the valley.
- 3.1.9 Standard operating procedure of the company and the operations manual among other things lacks the following
  - 3.1.9.1 Organisational structure for the detachments with proper allocation of the duties.
  - 3.1.9.2 Qualification and the experience requirements for the chief pilot both for the company and the detachment
  - 3.1.9.3 Altimeter setting for pressure altitude.
  - 3.1.9.4 Approach procedure for the Sh. Amarnath Ji Helipad
  - 3.1.9.5 Procedure for aborted landing.
- 3.1.10 Position of the chief Pilot in the company is still vacant.

3.1.11 monitoring of the crew qualification was not strictly enforced. The company SOP was not followed. This indicates that the crew is engaged in the routine flight activity and never discuss or practice the possible emergencies which can be encountered. No record of organisation safety and surveillance activity exist. Therefore there is need for the company to strengthen its flight safety/surveillance programme.

### **3.2 Probable cause:**

Accident occurred due to the sudden sink experienced by the pilot during landing at Sh. Amarnathji helipad and his inability to recover from it.

Contributory Factors are:

- (1) Improper technique used for the steep approach.
- (2) Approaching the landing site at an angle from the left and making steep bank during the recovery process.

## **4. SAFETY RECOMMENDATIONS**

- 4.1 Action deemed fit may be taken against the concerned crew in view of findings (3.1.3, 3.1.4, 3.1.6, 3.1.7 and 3.1.8)
- 4.2 Regulatory authority may consider prescribing guidelines for preparing Standard operating procedures for the seasonal hill operations by helicopters.
- 4.3 M/s Himalayan Heli Services may be advised to take appropriate action in view of findings (3.1.5, 3.1.9, 3.1.10 and 3.1.11)

(Maneesh Kumar)  
**Inspector of Accidents**  
VT-WEX

New Delhi  
27.04.2010