FINAL INVESTIGATION REPORT OF ACCIDENT TO M/S RAN AIR SERVICES LTD BELL-430 HELICOPTER VT-REO NEAR VENKATPURAM, DISTRICT KHAMMAM, ANDHRA PRADESH ON 3.8.2008.

a) Helicopter	
Type	: Bell 430
Nationality	: Indian
Registration	: VT-REO
b) Owner/Operator	: M/s Ran Air Services Ltd
c) Pilot-in-Command	: Line Pilot, CHPL No.318/2
Extent of Injuries	: Fatal
Copilot	: Line pilot, CHPL No.359
Extent of Injuries	: Fatal
d) Number of passenger on board	: Two(AME &Tech.)
Extent of Injuries	: Fatal
g) Place of accident	: Lat. **18° 24' 15 "** North, Long.**80° 42' 34.9 "** East :Venketpuram, Andhra Pradesh
h) Date & time of accident	: 3rd August,2008; Approx.(1027 UTC)

SUMMARY

M/s Ran Air Services Bell-430 helicopter VT-REO while engaged in a non-schedule flight from Hyderabad Begumpet Airport-Jagdalpur-Raipur on 3.8.2008 was involved in an accident on a hill at a place name kodijutta gutta near Venkatpuram, Andhra Pradesh. The helicopter was under the command of line pilot and was assisted by copilot in the cockpit. There were 2 more persons one AME and technician on board the helicopter at the time of accident.

Helicopter took off from Hyderabad Begumpet Airport at 0928 UTC and was scheduled to land at Jagdalpur Aerodrome for refueling before proceeding to its final destination Raipur. The helicopter made last contact with Hyderabad ATC through relay IAC –941 flight when it reported its position at 0955 UTC as 60 miles from Hyderabad. When the helicopter last reported to the Hyderabad ATC, no abnormality was reported by the pilot. Thereafter there was no contact of the helicopter with Hyderabad ATC or with any other aircraft flying in vicinity. Search and rescue were started and lasted for about 3 months. Finally on 13.11.2008 the wreckage of helicopter was spotted by a local villager on a hill of Kodijutta Gutta near Venkatpuram, Andhra Pradesh. All the four persons on board received fatal injuries. Helicopter was destroyed due impact with the hill and there was fire. There was heavy rain reported on 3.8.2008 in the area where accident occurred.

1. FACTUAL INFORMATION

1.1 History of the flight:

M/s Ran Air Services Bell-430 Helicopter VT-REO arrived at Begumpet Airport, Hyderabad on 31.7.2008 from Nellore at 1020 UTC. The said helicopter operated its flight from Hyderabad-Vijayawada sector on 2.8.2008 at 0200 UTC and returned to Hyderabad at 1014 UTC with total flying of 3:20 hrs. VT-REO helicopter was engaged in a non-schedule flight from Hyderabad Begumpet Airport-Jagdalpur-Raipur on 3.8.2008. As per the flight plan (VFR) filed by pilot with Hyderabad ATC the flight level was 3000 feet and the ETA Jagdalpur was 1030 UTC which was then revised to 1102 UTC and ETA Raipur indicated was 1230 UTC. Total distance from Hyderabad to Jagdalpur was 225 Nautical miles. Helicopter prior to flight was refueled through IOC Bowzer on 3.8.2008 with 625 litres of ATF in presence of the Aircraft Maintenance Engineer. Refueling operation started at 0800 UTC and ended at 0820 UTC. At the time of take-off from Hyderabad total fuel on board was about 788 liters. Pilot in Command had taken the communication and met briefing self and signed in the respective columns of flight plan. As per Met office a request was received by them on phone from operator of VT-REO for Hyderabad-Jagdalpur-Raipur sector on 2.8.2008 but no person turned up for the met briefing on 3.8.2008 for the flight proposed. The flight plan was accepted by Hyderabad ATC at 0830 UTC. The terminal area forecast issued by Hyderabad Met office indicated winds 250/10-20 kts, visibility 6000 meters, clouds scattered at 1000 feet,2000 feet, overcast at 8000 feet with tempo visibility 3000 meters,

thunderstorm/ rain, clouds broken at 1000 feet, scattered at 2000 feet, few CB at 2500 feet and overcast at 8000 feet. Before start up at Hyderabad the weather passed to helicopter was QNH 1005, Temp 25, Wx Haze, Visibility 5 Kms, Winds 270/08 Kts and R/W in use 27. Clouds scattered at 1000 feet, Scattered at 1500 feet, Few CB 3000 feet, CB Towards N/SE BKN 8000 feet. Helicopter was cleared by Hyderabad ATC for Jagdalpur in direct coordination with the Air Force authorities for its assigned altitude of 3000 feet. Helicopter took off at 0928 UTC from R/W 27 of Hyderabad Airport. After take-off, Hyderabad ATC asked the helicopter at 0929 UTC to climb to 3000 feet and confirm that you have coordinated with Air Force areas for direct routing to which the pilot replied affirmative. At this time the pilot requested ATC that they will maintain 2500 feet due weather. At 0930 UTC the helicopter requested ATC that they will maintain 1000 feet above obstructions all thru (AOL) which was accepted by Hyderabad ATC. At 0935 UTC Hyderabad ATC asked the helicopter about its ETA Jagdalpur to which the helicopter replied 1102 UTC. At 0941 UTC Hyderabad ATC asked the pilot, confirm HF on board to which the pilot replied negative. Thereafter at time 0942 UTC Hyderabad ATC asked the helicopter about its estimate time for the reporting point Bobed to which the helicopter replied standby. At 0946 UTC, Hyderabad ATC made calls to helicopter. At 0947 UTC, Hyderabad ATC asked Jetlite flight JLL-612 to give a call to VT-REO for its position. At 0948 UTC helicopter reported its position as 40 miles out and Bobed will be 1008 UTC. At this point ATC asked the helicopter how do you read him to which helicopter replied two to three (readable now and then to readable with difficulty). Again at time 0948 UTC, ATC Hyderabad had asked the helicopter whether he will maintain 1000 feet AGL or 1000 feet above obstructions all through (AOL) to which the reply was conveyed through Jetlite flight 1000 Feet AOL. Soon the ATC Hyderabad asked the helicopter to relay its position 60 miles from Hyderabad. At 0955 UTC, the IAC 941 flight has conveyed to Hyderabad about helicopter reporting 60 miles. Thereafter there was no communication received from helicopter or from any other aircraft flying in its vicinity. The PIC was using blackberry net through his mobile during the flight. He has used the same through Airtel GPRS service last time at 15:42 IST time on 3.8.2008. The helicopter was on its direct track to Jagdalpur aerodrome and no deviation was found from the assigned route. The weather en route was bad as per the recordings in the Cockpit Voice Recorder. No warnings/malfunction observed on helicopter system prior to the accident. On 13.11.2008 Superintendent of Police, District Khammam Andhra Pradesh informed that wreckage of missing helicopter has been spotted on hill top of Kodijutta Gutta near Venkatpuram and is about 2 kms from Chattisgarh state Border. The coordinates of the accident site are Lat. **18° 24' 15 "** North, Long. **80° 42' 34.9 "** East.

Helicopter was destroyed due impact with the hill and there was fire after the accident. All the four occupants on board the helicopter received fatal injuries. There was heavy rain reported on 3.8.2008 in the area where accident occurred.

1.2 Injuries to Persons:

INJURIES	CREW	PASSENGERS	OTHERS
FATAL	Two	Two	Nil
SERIOUS	Nil	Nil	Nil
MINOR	Nil	Nil	Nil

1.3 Damage to aircraft: Helicopter was destroyed due impact with the hill and post impact fire during the accident.

1.4 Other damage: NIL

1.5 Personnel Information:

1.5.1 Pilot-in Command:

Line pilot
Date of Birth: 2.1.1947.
Age: 61 years 7 month approx.

License: CHPL No. 318/2 (issued on 16.11.90 and duplicate license issued on 15.12.99 and was valid up to 3.1.2012.)

FRTO No: 4225/2, Valid up to 3.1.2012.

The I/R Check record available was of January 2007 in training licensing directorate of DGCA. Though the Last I/R Test carried out in December 2007 however no flying records i.e. I/R Test proforma found in the Directorate of training and licensing, DGCA of the pilot.

Pilot in Command joined Defense Services on 29.12.1968 and was retired from Indian Air force as Wg. Commander on 31.7.1992 after serving for about 24 years of total service. He Joined Govt. of Madhya Pradesh and worked there as Senior Pilot from 1992 to 2004 and thereafter became Director/Chief pilot. He joined Ran Air w.e.f 1.3.2008 and since then he was flying with the Ran Air.

He held PIC endorsements on his CHPL for Alloute III, Bell-430 and Bell-407 type helicopters. He was last medically examined on 16.6.2008 wherein he was advised to wear corrective bifocal lenses while exercising the privileges of his license and in next review after 6 months executive report on hearing performance during flying was requested.

Bell 430 helicopter was endorsed on his license on 18.2.98. His flying records are as under:

During last 90 days:	16:30 hrs.
During last 30 days :	06:35 hrs.
During last 7 days:	03:20 hrs.
During last 24 hours:	03:20 hrs. (as on 2.8.2008)

Total Hrs.

i) Total Flying Experience :	10906:10 hrs.
ii) Total Flying Exp. as PIC:	8219:30 hrs.
iii) Total Flying Exp on type Bell-430	1838:10 hrs

Co-pilot:

Line pilot

Date of Birth: 26.7.1964.

Age: 44 years 1 month approx.

License: CHPL No. 359 (issued on 11.10.93 and was valid up to 24.2.2013.) I/R test was carried out in March 2008 and records are available in the Directorate of Training and licensing in the flying records of the pilot.

Pilot joined Civil Flying at Patiala Flying club after First year of B.A served as an Asstt. Pilot Instructor (API). Thereafter, in year 1992 he joined as a Helicopter pilot in Aviation Research Center, Govt. of India. He was released from the services on 4.7.2007. He joined Ran Air w.e.f 1.8.2007. After joining Ran Air he had undergone Bell-430 training at Manufacturer's course at USA in September 2007 and since then he was flying with Ran Air.

He held PIC endorsements on his CHPL for Chetak and Bell-430 type helicopters. He was last medically examined on 28.5.2008 wherein he was advised to wear corrective bifocal lenses while exercising the privileges of his license.

Bell 430 helicopter was endorsed on his license on 14.3.2008. His flying records are as under:

During last 90 days:	16::15 hrs.
During last 30 days :	09:10 hrs.
During last 7 days:	09:10 hrs.
During last 24 hours:	03:20 hrs. (As on 2.8.2008)

Total Hrs.

i) Total Flying Experience :	4046:45 hrs.
ii) Total Flying Exp. as PIC:	3099:00 hrs.
iii) Total Flying Exp on type Bell-430	0052:05 hrs

There was no flight duty/flight time exceedance found for both the pilots from the flying records of last six months.

As per the records both the pilots did not fly on the route (Hyderabad-Jagdalpur- Raipur) earlier after joining the operator.

Both the pilots were also not issued any authorization by the maintenance agency to certify any inspection (Transit inspection) on Bell-430 helicopter.

1.6. Helicopter Information:

Bell 430 is a four bladed twin-engine high-speed corporate and executive helicopter capable of speeds up to 257 km//hr. It has maximum certified take-off weight as 4218 Kgs. The helicopter has seating capacity of five passengers with 2 pilots. The semi monocoque fuselage is of failsafe light alloy structure. The landing gears and fuel tanks are installed in the sponsons on the lower section of the fuselage. The helicopter has a high swept back vertical fin. Main rotor blades are bearing less, hinge less and are made from composite material. The all-composite main rotor is installed with a liquid inertia vibration elimination (LIVE) pylon isolation system which gives improved performance and reduced maintenance requirements. Tail rotor is a two blade, semi rigid system mounted on the left side of tail boom. All metal blades incorporate spherical pitch change bearings. Rotor flapping is allowed by a delta hinge for stability during hover and forward flight. The main rotor and tail rotor flight control systems, consisting of cyclic, collective, and anti-torque controls are used to adjust the helicopter attitude, altitude and direction of flight. The flight controls are hydraulically boosted to reduce pilot effort and to counteract control feedback forces. The avionics suite includes a Honeywell KFC 500 automatic flight control

system (AFCS) with Bendix King Gold crown III communications. The flight deck is fitted with a Rogerson- Kratos Liquid crystal display integrated instrument display system. Helicopter is fitted with colored weather radar from Bendix-King. Two pilots seats in cockpit are crashworthy and energy absorbing seats. A separate cargo area capacity 500 lbs and volume 1meter cube is available for equipment storage. The fuel system is rupture resistant and is equipped with self-sealing breakaway safety fitting units. The helicopter is fitted with wheeled landing gear. The main units of Hydraulically retractable tricycle gear are fitted with hydraulically operated disc brakes.

The helicopter is fitted with two Rolls Royce 250-C40 B an internal combustion turbo shaft engine featuring a free power turbine. The gas generator is composed of a single stage single entry centrifugal flow compressor directly coupled to a two-stage gas generator turbine. The power turbine is a two stage free turbine which is gas coupled to the gas generator turbine. The engine has a single combustion chamber with single ignition. The engine is designed with Take off power of 534 KW/715 SHP. The engines are equipped with Chandler Evans Full Authority Digital Control (FADEC) System.

Bell-430 helicopter VT-REO bearing aircraft S/No. 49065 manufactured in year 2000 and was brought to India by M/S Ran Air in November 2007. The Certificate of Registration no. 3646 was issued on 6.12.2007 under Category "A". The first Certificate of Airworthiness no. 3056 was issued on 10.1.2008 under Normal Category, sub division "Passenger" aircraft. The last C of A was revalidated on 24.1.2008 and was valid till 9.11.2010. The helicopter was having Aero-mobile license No. A-004/005-RLO (NR) valid till 31.12.2008. The helicopter since manufacture had done 1712:53 hrs till 31.7.2008 and had done about 191 hrs since last C of A. The No. 1 engine S/No. CAE 844137 had done 1712:53 hrs/3179 cycles till 31.7.2008. No. 2 engine S/No. 844138 had done 1641:29 hrs/3155 cycles till 31.7.2008. The maintenance of the helicopter was on contract to M/S Shourya Aviation Limited, Delhi. The helicopter was being maintained airworthy by periodically carrying out the inspections as per approved Maintenance Planning Document. Last 600 hrs/annual inspection was performed on the helicopter on 10.6.2008 at 1676:28 A/F hours. Thereafter last 50 hrs/1 month inspection was carried out on 31.7.2008 at 1710:48 hrs. Last 300 hrs/12 month inspection on both the engines carried out on 10.6.2008 at 1676:28 engine hrs/3143 cycles and at 1605:04 hrs/3118 cycles. Certificate of Release to service(CRS) is issued after daily inspection by the authorized person.

The helicopter is fitted with Auxiliary fuel tanks and total fuel capacity is 893 litres (727 Kg) and total 788 litres of fuel was on board at the time of commencement of flight on 3.8.2008.

Scrutiny of helicopter records indicates that since induction of helicopter with the operator three snags were reported and their rectification was carried out, the details of which are as under:

On 25.5.2008 crew reported rotor brakes sluggish-
During rectification rotor brake bleeding carried out and operation was found satisfactory.

On 9.6.2008 crew reported total 3 snags during ground run after completion of 600 hrs inspection/annual inspections.

i) No.1 engine power (minus 3),
ii) Anti Ice both U/S,
iii) ECS Not effective.

During rectification for A snag- Power recovery wash i.e compressor wash was carried out. For B snag- Anti-ice valve connectors were cleaned and installed back For C snag- Air temperature control contact was cleaned and aircraft offered for ground run and nil snag was reported.

On 22.6.2008 crew reported on level ground H/C taxying with left wing low.
During rectification left oleo was charged.

On 17.7.2008 during Daily inspection pilot side (RH) windshield found cracked. The same was replaced and air test carried out which was found satisfactory.

No snag was reported thereafter till the time of accident on the helicopter. All the mandatory modifications applicable were complied till 22.1.2008 at the time of validation of last C of A. The maintenance programme of the maintenance agency M/s Shourya Aviation Limited, Delhi for Bell-430 helicopter has been approved by DGCA.

The helicopter is fitted with one Emergency Locater transmitter Type Artex –C406-2HM, Part No. 453-5001-419, S/no. 00281 at the time of accident. ELT unit was found in the helicopter wreckage and was separated from its anteena assy during the impact. ELT fitted on the helicopter did not function during impact with the hill. The ELT is installed on the helicopter in the aft

fuselage at aircraft station between station no.313.23 and 324 below the aft avionics compartment and access is through the ADF antenna panel. ELT Antenna is located at Right engine oil cooler panel. The said unit was removed from the helicopter on 30.5.2008 due its Non Radiating power check due on 31.5.2008 by Radio AME authorized by M/S Shourya Aeronautics Limited. The said check was done at M/S AR Aerotech, New Delhi on 30.5.2008 and the same was released after test. Thereafter the same unit was installed by AME under the CAR 145 authorization no.QAP01/08/26 dated 28.5.2008 and subsequent to its installation the unit operation check was carried out which was found satisfactory.

During scrutiny of helicopter records lots of cutting and overwriting found in the Helicopter Tech log and other logbooks. In the helicopter engine performance monitoring, numbers of graphs are being plotted for the engine parameters however proper monitoring/analysis of the engine health monitoring is not being done by the maintenance agency of the said helicopter.

It was also found during investigation that the monthly check recommended by the manufacturer Artex Aircraft supplies, Oregon, USA on the ELT was not being carried out by the Maintenance agency. The nodal officer of the operator could not oversight the maintenance activity of the agency to whom the maintenance is contracted. The Regional Airworthiness office also failed to monitor the maintenance activity of the maintenance agency.

1.7 Meteorological Information:

As per the ATC Tape the helicopter was provided the weather of time 0840 UTC during start up at 0916 UTC while departing from Hyderabad as QNH 1005, Temp 25, Wx-Haze, Visibilty-5 Kms, Winds 270/08 Kts, Clouds scattered 1000 feet, Scattered 1500 feet, Few CB 3000 feet, CB towards N/SE, Broken 8000 feet.

The weather report for the Final destination Raipur valid from 0730 UTC to 1030 UTC was Visibility 6 Kms, Clouds Few 2000 feet, Scattered 2500 feet and QNH 1000/999.

Terminal Area Forecast issued by Hyderabad Met office valid from 0600 UTC to 1500 UTC is as under:

TAF VOHY 030615 UTC – 250/10-G 20 Kts, Visibility 6000 meters, Clouds scattered at 010, Sct 020, OVC 080, Tempo 0915 3000, TSRA/RA BKN 010, SCT 020, Few CB OVC 080.

TAF VARP 030615 UTC –280/10 Kts, Visibilty-4000 meters, Haize, Sct 015, Bkn 090, Becmg 0711 5000 Hz, Tempo 0615, Visibility 2500, TSRA/SHRA SCT 010 Few 030/250 CB OVC 080.

TAF VANP 030615 UTC 290/08 Kts, Visibility 4000 meters, Haize, few 015, Sct 020, Bkn 100, Tempo 0615 320/10- Gusting 20 Kts, Visibility 1500 meters, TSRA/SHRA Few 010 Sct.015, few 025 CB Ovc. 080.

Winds forecasted below 5000 feet for the Hyderabad-Jagdalpur-Raipur dated 03/0000 UTC are as under:

VOHY	JAGDALPUR	VARP
Flight Level	Wind	
020	270/020Kt becmg 300/10 Kts	Temp- 28 deg C
030	270/020Kt becmg 320/10 Kts	Temp-26 deg C
050	270/030Ktsbecmg 320/10 Kts	Temp- 22 deg C
070	270/035Ktsbecmg 340/10 Kts	Temp-18 deg C.

As per the weather issued for FL 100 to 250 valid till 1800 UTC for Route Hyderabad-Jagdalpur-Raipur of 3.8.2008 indicated as isolated embedded CB with Mod to severe turbulence and Mod icing for en route is the forecast issued in TAFORS.

As per the ATC Tape the helicopter was cleared for 3000 feet altitude by Hyderabad ATC. However immediately after take off helicopter reported to ATC that they would like to maintain 2500 feet due weather. Soon thereafter helicopter reported to ATC that they would like to maintain 1000 feet AOL (Above obstructions all through) and the same was approved by the ATC.

During the CVR replay it was mentioned by the crew during intra-cockpit conversation with each other that the weather is bad and wiper of the helicopter was found kept ON as the wiper running sound is heard throughout the flight as recorded in the CVR.

As per the records on 3.8.2008 total of 132.4 mm of rainfall was recorded by Venkatpuram state authorities. The satellite picture of 3.8.2008 at time 14:30 hrs has also shown the presence of clouds in the area where flight was being operated.

As per the Met office Hyderabad, a request was received by them on phone from the operator for Hyderabad-Jagdalpur-Raipur sector on 2.8.2008 for departure of helicopter VT-REO on 3.8.2008. The flight levels were not given properly and informed to plan for 2000 feet Above Ground Level (A.G.L). Also it was informed to the Met that actual flight level would be informed after confirmation from the pilot. However on 3.8.2008, same person was on duty from 0800 hrs to 1400 hrs IST. The briefing person for the aforesaid flight had not turned up. More so no folder was prepared by the met officer on duty for want of actual flight levels.

As per the Govt. of Aviation, Chattisgarh Quality Control Manager report, the helicopter VT-REO was to land at Jagdalpur and on the day of accident the weather around Jagdalpur was bad.

1.8 Aids to Navigation:

The helicopter took off from R/W 27 of Hyderabad Begumpet Airport and an aid to Navigation is not a factor. The helicopter was programme to land at Jagdalpur Aerodrome where in no Navigational aid was installed as it is an uncontrolled aerodrome.

1.9 Communications:

The helicopter was fitted with 2 VHF communication sets. However HF communication set was not fitted on the helicopter. All the conversations made by Helicopter with ATC through VHF Sets. On the day of accident helicopter made first contact with Hyderabad ATC at time 0914 UTC wherein it asked the start up clearance which was approved at 0915 UTC. The helicopter took off at 0928 UTC from R/W 27 of Hyderabad Begumpet Airport and remained in direct contact with Hyderabad ATC till 0942 UTC. At 0947 UTC the helicopter relayed its position through Jet Lite flight 612 at 0948 UTC as 40 miles out and Bobed will be 1008 UTC. At same time i.e. 0948 UTC the ATC asked the helicopter how do you read me to which it transmitted "two to three sir "to ATC. At 0948 UTC ATC asked whether it will maintain 1000 feet AGL or 1000 feet AOL. The helicopter replied through the Jet Lite flight as 1000 feet AOL. Thereafter it could not make direct contact with Hyderabad ATC and its last position was reported through IAC 941 at 0955 UTC as 60 Miles from Hyderabad.

From the above it is evident that the pilot was not maintaining the assigned altitude due weather and was flying at low altitude which disables him to contact with the ATC at even smaller distance.

1.10 Aerodrome Information:

Helicopter VT-REO was parked on apron at Hyderabad Begumpet Airport. The elevation of the airport is 531.3 meters/1742 feet and the geographical coordinates are Latitude 172711.2N and Longitude 0782729.1E. The airport has only one Runway 09/27 which is 3230 meters long and 45 meters in width. The R/W surface is made from Tarmacadum. The airport is fitted with DVOR,DME and ILS Category I navigational equipments. The ATC flight plan of the flight was not sent by Hyderabad ATC to Raipur ATC which was the final destination of the helicopter.

The airport is fitted with a Radar Wastinghouse make whose display replay was carried out after the accident and the helicopter was observed flying at a height of 2900 feet and was seen on radar screen up to a distance 23 NMs from Hyderabad Airport. This was due to the radar antenna tilt which was set at 0.5 degrees and hence the aircraft flying at height of 3000 feet will be captured by Radar up to a distance of 20 NMs approximately. More so the print out for the radar pictures could not be provided from the system.

The helicopter was programmed to land at Jagdalpur for a refueling halt. The aerodrome is an uncontrolled aerodrome with No ATC and no navigational landing aid facility.

The Helicopter's final destination was Raipur Aerodrome. The Aerdrome's elevation is 317 meters/1041 feet with the Geographical coordinates as Lat- 21°10' 49" N and Long- 081°44' 20" E. It has only one Runway 06/24 1955 meters long and is made up of Asphalt. The ATC facility exists at the Aerodrome. VOR/DME ILS/DME and PAPI approaches are available.

As per the Jeppson's Grid map the area where the accident occurred the minimum safe altitude for an IFR flight should have been 4500 feet.

1.11 Flight Recorders:

Bell-430 helicopter was fitted with one Fairchild Model A100 A, S/No. 59852 Cockpit Voice recorder (CVR) capable of recording the conversation between helicopter with Air Traffic control and aural environment of the

cockpit. The CVR fitted was of tape type and is capable of recordings of 32 minutes of flight conversation.

During accident CVR suffered damage (a dent) to its dust cover (Orange outer casing) at Left top middle portion (Viewing from rear) and damage was also observed on the Underwater Locator Beacon bracket. However all the four screws holding the bracket were in place. ULB S/No. DN 9128 (CODE B) had expiry date June 2011.
The retrieved CVR from the crash site was brought to DGCA R & D laboratory for examination and analysis. During disassembly the Magnetic tape condition was found satisfactory. The tape was removed and played on the Racal Recorder. The timings are given in Minutes and seconds from the beginning of tape. Following observations are made while playing the tape:

1. At time 4:39 from the beginning the P2 has mentioned identifying the railway line Warangal.
2. At time 16:43 there is talk between P1 and P2 about presence of bad weather.
3. At time 21:44 P2 said to P1 that the wiper on your side is not working properly.
4. At time 25:34 P2 has mentioned to P1 Badi Nadi hai, which was identified by them as Godavari River.
5. At time 26:31 there is talk between P1 and P2 about keep on looking at the Radio Altimeter.
6. At time 29:57 the P2 has said eleven hundred seventy and at time 32:16 he said twelve forty.
7. At time 32:24 there is increase in the Rotor RPM sound.
8. At time 32:28 there is an impact sound and end of recordings in CVR.
9. Most of the conversations were made by the P2 in the cockpit.
10. The quality of recordings in CVR was not satisfactory in the combined channel.
11. The wiper sound is heard throughout the flight.
12. There was no emergency declared by the crew or any panic in the cockpit at any stage of the flight.

1.12 Wreckage and Impact Information:

Helicopter wreckage was found on 13.11.2008. It was located on a hill namely Kodijutta Gutta near Venkatpuram, Andhra Pradesh which is about 2 kms away from the Chattisgarh State border. The place is located about 140 Nautical Miles from Hyderabad Begumpet Airport. The coordinates of the accident site are as under :
18 ° 24’ 15” N & 80° 42’ 34.9” E

The accident site is not accessible by any road and is badly affected by naxalite activities and there are no habitants close to it and are about 40 kilometers by foot from Venketpuram Police Station.

1. Height of the hill on which the helicopter wreckage was found is about 829 meters i.e. 2720 feet.
2. Accident occurred on the hill slope at 80 feet below from its peak.
3. Helicopter wreckage was spread lengthwise for about 300 feet.
4. The Area where wreckage found was full of vegetation and bamboo trees and having big boulders.
5. Helicopter before impacting with the hill slope has chopped number of tree tops and stuck with number of boulders present on the hill before coming to halt.
6. Main wreckage was found in three clusters i.e. cockpit section, tail section with main rotor blades and engines section.
7. Right wheel was found in the retracted condition.
8. Both engine fire bottles were in charged condition (not activated).
9. Both engines had evidence of fire.
10. Cockpit portion in its final position is tilted to the left side with Right side instruments on top.
11. CVR unit was found on a tree branch against a boulder.
12. ELT unit was found lying outside close to the wreckage along with tail rotor tie down strip.
13. Pilot side seat was found uprooted and was lying upside down in the flight direction with nose wheel tire lying close to the wreckage.
14. Portable external battery, wooden chock, ladder was found carried in the helicopter as seen at the wreckage site.
15. Laminated Maps, operations manual, Laminated Cockpit checklists, manifest, Passengers safety briefing cards, Transit inspection card, Post flight inspection card etc. were found at the wreckage site.

As per the records on 3.8.2008 total of 132.4 mm rainfall was recorded by the Venketpuram State authorities. More so the satellite picture of 3.8.2008 at time 14:30 hrs has shown the presence of clouds where the flight was being operated.

The site of the accident could not be visited by the Inspector of accidents due safety advisory by the State Police in providing security to the team due heavy naxalite activity in that area. The wreckage evidences are derived from the still/ video coverage done by the local people. Some of the

components of accidented helicopter were brought down from the hill for inspection.

The speed calculated from the distance traveled versus the time, helicopter was traveling at an approximate with 125 kts indicated air speed and 150 kts of ground speed having tail winds of apprx 25 kts and took about 56 minutes to cover 140 Nautical miles i.e. place of accident. The approximate time of accident works out to be 1027 UTC i.e. 1557 hrs IST.

1.13 Medical and pathological information:

Total there were four persons on board the helicopter at the time of accident. All the persons on board received fatal injuries during the accident. All the four bodies were removed from the helicopter wreckage on 14 /11/2008 and were taken to Govt. Hospital, Warangal, Andhra Pradesh for medical examination. The post mortem of all the four persons was carried out on 15.11.2008 and cause of death as per the report is due to multiple injuries sustained during the accident.

1.14 Fire:

There was no fire reported in flight. However the evidence of fire was noticed on both engines deck area after the impact.

1.15 Survival aspects:

Accident was not survival as the helicopter directly collided with the hill en route in bad weather condition and there was no habitants residing close to it.

The Hyderabad ATC did not make any effort to locate the helicopter after its ETA of Jagdalpur got elapsed and did not contact to Jagdalpur Aerodrome or Raipur Aerodrome, which was the helicopter's final destination. As per WSO log book at 1420 UTC a call was received from Ran Air representative enquiring VT-REO has not landed at Jagdalpur and no contact with pilot of the helicopter. When more than 3 hours of its ETA at Jagdalpur passed, ATC Hyderabad came into action and thereafter the search and rescue procedures started to locate the helicopter. At 1445 UTC WSO, Hyderabad had contacted Manager ATM, Raipur and explained the details of VT-REO. Manager ATM, Raipur then informed that they have not received the ETA or Flight Plan from VOMM FIC or VABB FIC neither REO has contacted or landed at Raipur.

ISRO, Bangalore which is having satellite aided search and rescue system for monitoring the ELT activation of the civil registered aircraft also did not receive any distress signal from the ELT of the helicopter VT-REO. The ID of the helicopter is though registered in their database. As per their report, operator was in contact with them soon after the helicopter went missing. The system was kept on watch for about a week and found no signal was picked up within specified air route. As per them the ELT did not work and hence non activation of ELT is to be investigated.

Operator was informed by the Chief Pilot of Chattisgarh Govt. at 2000 hrs IST on 3.8.2008 that their Bell-430 helicopter had not reached Jagdalpur for refueling. Search and rescue (SAR) operations started immediately with the help of fixed wing and helicopters by Central Government, Non-Govt. and state Govt. agencies. Total of 150 hrs aerial survey was done by Air Force, Navy, State Govt. and privately hired helicopters. Ground parties were also deputed by the state police authorities for locating the missing helicopter. During SAR police party also ambushed by Naxalities. Ground recee was further intensified and a team of village volunteers, NGO's CISF and special task force troops also joined the team of SAR. National remote sensing agency (NRSA) also carried out the aerial survey and photography with infra red camera and gave certain coordinates for ground search. However no wreckage was found on those locations. Hence a cash award of Rs. 2 lakh was also announced by the operator for the person who would locate the helicopter wreckage. As the area of search was huge with massive growth of vegetation and inclement weather with rivers and rivulets flowing above the danger mark for over a month making the approach almost impossible by ground or air. In spite of all these odds SAR by all agencies carried out for a protracted period of approximately two and half months but was futile. SAR was carried out in large areas of Bastar, Bijapur, Dantewara and Jagdalpur. SAR was suspended due presence of naxalites, bad weather, dense forest and difficult terrain. However there was no success. All Govt. helicopters were put to service through Search and rescue control center (SARCC) at Chennai and Mumbai. Aviation Research Centre aircraft also did the aerial survey and gave the coordinates to SARCC where search was carried out. The area searched by the operator and Air Force jointly the coordinates of which are as under:

Lat.	N 18 34	Long.	E 080 50
	N 19 00		E 081 10
	N 19 15		E 081 36
	N 19 10		E 082 05

N 18 20 E 081 13
N 18 34 E 080 50

In addition the search was also undertaken by the Air Force between the following coordinates:

Lat. N 18 37 Long. E 080 15
N 18 47 E 080 34
N 18 23 E 080 53
N 18 10 E 080 33

The Aerial SAR was done by two teams. One team i.e Civil Team and the second team was that of the Air force under whose jurisdiction the accident area came. However the subject area was not scanned. As per the police report aerial search has 60% credibility. The Indian Air Force on its own part has been operating and did not make any efforts to synergise the efforts of all, thus reducing the efficacy of the survey.

On 26.9.2008 a FIR S/no. 60 dated 26.9.2008 was registered with Circle Inspector of Police, Venketpuram, Khammam District, Andhra Pradesh for the missing crew members on 3.8.2008 from 14:57 hrs IST, by son of PIC wherein he suspected that his father has either landed or crashed in dense forest or hills of the said district.

On 12.11.2008, a cowboy name, Sh. Kattam Suresh aged 25 years along with some friends went to Kodi Juttu gutta hill and noticed ruined parts of the helicopter and skeleton remains of human bodies. The same was reported to the police on 13.11.2008. On the advice of Police he along with some other friends went to Kodi Juttu Gutta hill on 14.11.2008 and brought the skeleton remains of deceased persons.

1.16 Tests and research:

Prior to accident, on 3.8.2008 VT-REO, had uplifted fuel (ATF) of 625 liters from IOC, Begumpet airport, Hyderabad. Subsequent to the accident, fuel sample was drawn by the Station Incharge, IOC, Begumpet Hyderabad from the concerned IOC Bowzer AR-318 and the respective storage tank (Tank no. 2) at Hyderabad Airport on 4.8.2008. The same was tested in the IOC lab, Vishakapatnam on 7.8.2008 and the sample passed the test. However no fuel and oil sample could be drawn from the helicopter as it went missing and could be located only after 100 days of crash.

1.17. Organization and Management Information:

Operator was issued with a Non-schedule operator's permit No.1/1998 on 19.1.1998 and which was valid till 18.1.2009. The operator has 8 number of aircraft endorsed on their permit including the involved helicopter. The maintenance of all the aircraft are outsourced to M/S Shourya Aeronautics Private limited, New Delhi-16. The operator has total 25 number of pilots(including 7 expats) on their pay roll to carry out the flying and 3 Flight Safety officials. The organization has also nominated a nodal officer to oversee the engineering activities of Maintenance agency. Last DGCA Audit of the operator was carried out in year December 2005. Earlier the name of the company was Vidyut travels Limited which was changed on 16.1.2006 and new permit was issued in the name of the operator.

The Involved PIC has joined the operator on 1.3.2008 whereas the copilot has joined the operator on 1.8.2007.

Company Operations manual for the helicopter has been prepared which needs to reviewed by the operator to incorporate minor changes e.g. organization chart and Monitoring of CVR etc.

1.18 Additional information:

The helicopter is fitted with one Emergency Locater transmitter Type (Third Generation) Artex –C406-2HM, Part No. 453-5001-419, S/no. 00281 at the time of accident. The ELT is capable of operating on 121.5 Mhz, 243 Mhz and 406.025 Mhz. The ELT's are designed to meet or exceed the requirements of TSO C91a, TSO C126 and the mandatory automatic ELT requirements of FAR Part 91. The ELT automatically activates during a crash and transmits the standard swept tone on 121.5 and 243 Mhz. Every 50 seconds for 520 milliseconds (long message protocol) the 406.025 Mhz transmitter turns ON. During that time an encoded digital message is sent to Satellite. The information contained in that message is shown below:

Serial no. of Transmitter or Aircraft ID.
Country Code.
ID Code
Position Coordinates (when coupled to an Artex ELT/NAV interface unit).

The 406.025 Mhz transmitter will operate for 24 hours and thus shuts down automatically. The 121.5/243.0 Mhz transmitter will continue to operate

until the unit has exhausted the battery power which typically will be at least 72 hours.

As per the Manufacturer's manual of ELT in the periodic maintenance in addition to the maintenance checks a monthly self test of ELT is recommended (page 4-2, dated 11/4/2001). The same monthly check is not being done by the Maintenance agency. The Component's Overhaul and Service life for Bell-430 helicopter issued by the maintenance agency in Jan 2008 and revised in March 2008 wherein it is mentioned that the item is an on condition item and contains only two checks for ELT the details of which are as under:

1. Non-radiating load check every year.
2. Replace battery every 5 years or as specified on ELT.

The above indicates that the COSL was never revised by the Maintenance agency to include the Monthly recommended check of ELT. More so no monitoring was done by the Nodal officer of the operator on the Engineering functions performed by the Maintenance agency.

Since the maintenance programme of the Maintenance agency was approved by the Regional Airworthiness office the monthly check recommended by the manufacturer on the ELT was also missed by them.

During the progress of flight the PIC possessed a Company mobile phone Blackberry with Air Tel connection. Investigation revealed that he was using blackberry net through Airtel GPRS (General packet radio service). He has used the net last time at 15:42 hrs IST on 3.8.2008 and accident took place thereafter.

Route selection:

The helicopter was planned to go to Raipur Aerodrome from Hyderabad, Begumpet Airport on 3.8.2008. For going to Raipur there are two different routes. First one is via Nagpur, which is under ATC Coverage and is a published route and the second one was through Jagdalpur, which is not under ATC Coverage and is not a published route. The only difference is that the route via Nagpur was little longer. The Jagdalpur Aerodrome is also not having any ATC or Nav aids for landing. The helicopter operations are carried out generally at low altitude hence the VHF operations are also not effective to have two-way communication with the ATC. The helicopter is also not fitted with the HF Communication set for two-way communication.

Both the pilots after joining the operator has not flown on the same route earlier. The helicopter was on its assigned/selected route and did not deviate from it.

The area where the accident took place is full of naxalite activities, dense forest and difficult terrain.

1.19 Useful or effective investigation techniques: Nil

2. ANALYSIS

The circumstances that could have led the crew to continue the flight are described as under:

2.1 Malfunctioning of the helicopter and/or its engine.

On 2.8.2008 Daily Inspection was carried out at Hyderabad by the AME and flown on Hyderabad-Vijayawada-Hyderabad and landed back at Hyderabad at 1014 UTC.

Helicopter prior to flight was refueled through IOC Bowzer on 3.8.2008 with 625 litres of ATF in presence of the Aircraft Maintenance Engineer. At the time of start of flight on 3.8.2008 helicopter had 788 liters of fuel, which was sufficient for the flight proposed. Daily inspection schedule to be carried out by the AME every day before first flight of the day. All the required inspections were carried out on the helicopter except the Monthly inspection on ELT recommended by the manufacturer which was not included by the maintenance agency. The same was not monitored by the Nodal officer of the operator. The Regional Airworthiness office failed to monitor the oversight of the maintenance activity of the maintenance organization. Maintenance is not directly factor to the accident but subsequent to the accident the ELT did not activate due improper maintenance carried out by the maintenance agency.

The mandatory modifications applicable to the helicopter on type were complied till 22.1.2008 when the helicopter had undergone the renewal of C of A inspection. No snag was pending on the helicopter till the date of accident. On the day of accident there was no malfunction of helicopter system reported on R/T neither with ATC nor during the intra-cockpit conversations of the crew as recorded in the CVR. However the recording quality of the CVR was not good. There was no warning/malfunction of helicopter system reported in the CVR. Both the engine fire

extinguishers/bottles were found in the charged condition implying that there was no engine fire in flight. The helicopter cockpit portion was tilted to the left side in its final position and the fire started on both the engines area after its impact with the hill as there is no conversation recorded in the CVR about engine fire. The helicopter was not fitted with the HF R/T equipment, which should have been utilized by the crew to have two-way communication with the ATC throughout the flight.

The site of the accident could not be visited by the Inspector of accidents due safety advisory by the State Police in providing security to the team due heavy naxalite activity in that area. The wreckage evidences are derived from the still/ video coverage done by the local people. Some of the components of accidented helicopter were brought down from the hill for inspection/investigation.

2.2 Pilot factor conducting the flight.

On the day prior to accident i.e. 2.8.2008 same crew had operated flight Hyderabad-Vijayawada-Hyderabad and arrived Hyderabad at 1015 UTC. The crew had adequate rest before the flight. On the day of accident PIC has filed up the flight plan (VFR Flight) self with Hyderabad ATC, which was accepted at 0830 UTC. The ATC flight plan has mentioned that crew had taken self-briefing for the communication and Met. However as per the met office no briefing was taken by the PIC from them on the day of accident. In the ATC flight plan crew mentioned flight level as 3000 feet, which was accepted by the Duty ATC. As per the flight plan, the flight was programmed as Hyderabad-Jagdalpur-Raipur. The ETA Jagdalpur was proposed as 1030 UTC, which was later on revised as 1102 UTC. Aircraft took off from Hyderabad Begumpet Airport at 0928 UTC and informed ATC after take-off that they will not be able to maintain the assigned altitude due weather and will like to maintain 1000 feet AOL which was approved by the Hyderabad ATC. This indicates that the weather was bad around Hyderabad during its take-off. Even the contact of helicopter with the ATC was intermittent and it remained in contact till 0946 UTC and was able to transmit its position through other flying aircraft in its vicinity. The last position of the helicopter transmitted to the Hyderabad ATC at 0955 UTC as 60 Miles through the IAC 491 flight. There after there was no contact with any of ATC as the route followed by crew is not covered under ATC. The Aerodromes enroute the flight were Warangal Aerodrome which is not having any ATC facility and the Jagdalpur Aerodrome which is also not having any ATC facility. As per the CVR tape the crew had identified the Warangal through its Railway line and later on when they approached one

river, which was identified by them as Godavari. The crews have even talked each other about the presence of bad weather in the CVR. The Wiper sound is heard through out the CVR recordings. No snag/warning was reported by the crew at any stage and most of the conversations done by the copilot. During progress of flight the crew was descending to have visual ground contact due weather. They were monitoring the helicopter height through Radio altimeter as mentioned in the CVR. There was no panic in the cockpit during the flight and the flight was on proper route and crew did not deviate from the proposed flight path. More so the crew carried sufficient fuel for the flight. The PIC had adequate experience on type whereas the copilot had only about 52 Hrs of flying experience on type. The I/R test carried out in December 2007 the records of which were not available with the Directorate of Training licensing of DGCA.

The flight plan was filed under the VFR rules and not the IFR as the crew chose the route via Jagdalpur which is not having any ATC or Navigational facility. The helicopter was not equipped with the HF Communication equipment and was thus facing difficulty in making contact with ATC because of low flying due weather. The Hyderabad ATC, also realized only after it took off from Hyderabad that the helicopter is not fitted with HF. The ATC flight plan was also not sent by the departure station i.e. Hyderabad to its destination Raipur Aerodrome.

The PIC has used blackberry net through Airtel GPRS service last time at 10:12 UTC (15:42 hrs.) on 3.8.2008 and accident took place thereafter.

2.3 Weather factor:

A request was received by the Met Office, Hyderabad Airport on phone from the operator for Hyderabad-Jagdalpur-Raipur sector on 2.8.2008 for departure of their helicopter VT-REO on 3.8.2008. The flight levels were not given properly and planned for 2000 feet A.G.L. Also it was informed to the Met that actual flight level will be informed after confirmation from the pilot. However on 3.8.2008, same Met. Official was on duty from 0800 hrs to 1400 hrs IST. The briefing person for the aforesaid flight had not turned up. More so no Met. folder was prepared by the met officer on duty for want of actual flight levels for the said flight.

At the time of start up the weather passed to helicopter by Hyderabad ATC, was QNH 1005, Temp 25, Wx-Haze, Visibilty-5 Kms, Winds 270/08 Kts, Clouds scattered 1000 feet, Scattered 1500 feet, Few CB 3000 feet, CB towards N/SE, Broken 8000 feet.

The weather report for the Final destination Raipur valid from 0730 UTC to 1030 UTC was Visibility 6 Kms, Clouds Few 2000 feet, Scattered 2500 feet and QNH 1000/999.

Terminal Area Forecast issued by Hyderabad Met office valid from 0600 UTC to 1500 UTC the details of which are as under:

TAF VOHY 030615 UTC – 250/10-G 20 Kts, Visibility 6000 meters, Clouds scattered at 010, Sct 020, OVC 080, Tempo 0915 3000, TSRA/RA BKN 010, SCT 020, Few CB OVC 080.

TAF VARP 030615 UTC –280/10 Kts, Visibilty-4000 meters, Haize, Sct 015, Bkn 090, Becmg 0711 5000 Hz, Tempo 0615 , Visibility 2500, TSRA/SHRA SCT 010 Few 030/250 CB OVC 080.

TAF VANP 030615 UTC 290/08 Kts, Visibility 4000 meters, Haize, few 015, Sct 020, Bkn 100, Tempo 0615 320/10- Gusting 20 Kts, Visibility 1500 meters, TSRA/SHRA Few 010 Sct.015, few 025 CB Ovc. 080.

As per the weather issued for FL 100 to 250 valid till 1800 UTC for Route Hyderabad-Jagdalpur -Raipur of 3.8.2008 indicated, as isolated embedded CB with Mod to severe turbulence and Mod icing for en route is the forecast issued in TAFORS.

There was no met or ATC facility exists at Jagdalpur Aerodrome which is an uncontrolled aerodrome.

As per the Govt. of Aviation, Chattisgarh QCM, on the day of accident, the weather around Jagdalpur was bad.

Also the area in which the accident occurred on the day of accident, total of 132.4 mm of rainfall was recorded by Venkatpuram state authorities.

From the above details it is indicative that the weather around Hyderabad Airport was bad due which the crew requested the ATC to fly at low altitude, immediately after take off. During the flight there is intra cockpit conversation between pilot and copilot recorded in the CVR that weather is bad while flying from Warangal to Jagdalpur. As per the eye witness the weather around Jagdalpur was bad and the area where accident occurred received heavy rainfall on the day of accident. So the presence of bad weather is considered as a factor contributed to the accident.

2.4 Circumstances that lead to the accident:

As discussed in the para 2.1 there was no snag pending on the helicopter on the day of accident and there was no malfunction of system reported to the ATC and no warning etc. recorded in the CVR during the flight. All the mandatory modifications applicable to the helicopter were complied with. So the aircraft factor for the accident is ruled out.

Since the crew was programmed to go to Raipur from Hyderabad Begumpet Airport on 3.8.2008 the crew decision to chose the route via Jagdalpur which was not a published route and is not covered under ATC, was not correct considering enroute weather conditions. The helicopter was not fitted with the HF RT Communication equipment, which would have been beneficial to them for having two-way communication with the ATC during the progress of flight. The weather around Hyderabad was also bad and so was at Jagdalpur. The route weather was also bad which was evident from the CVR tape and the area where the accident occurred received heavy rainfall of the month on the day of accident. Since the weather was bad and due presence of clouds the crew was descending the helicopter to have visual contact with the ground and they overlook the presence of hills en route. The height of the hill was about 2700 feet and the helicopter collided with the hill in flight resulting in fatal injuries to all four persons on board and substantial damage to helicopter.

Search and rescue procedure carried out by the various agencies to locate the helicopter wreckage were not in the coordinated manner which could not brought any results as the Indian Air Force on its own operating and not making any efforts to synergise the efforts of other operators in Search and rescue operations, thus reducing the efficacy of the survey.

More so the terrain and presence of bad weather, heavy naxalite activities were also the factors, which affected the SAR operations. The ELT also did not activate after the crash due improper maintenance by the maintenance agency, which also hamper the process of locating the helicopter wreckage.

3. CONCLUSIONS

3.1 Findings :

1. The helicopter had a valid Certificate of Airworthiness and Certificate of release to service on the day of accident.

2. Crew had appropriate licenses and valid ratings to undertake the subject flight.
3. Last I/R Test flying records of December 2007 w.r.t. PIC was not found in the Directorate of training and licensing of DGCA. The last I/R test record available with them was of January 2007.
4. There was no snag reported/recorded in the aircraft records prior to the date of accident.
5. Sufficient fuel was carried on board the helicopter for the proposed flight.
6. ELT fitted on the helicopter did not emit any signals during the crash and no signal was picked up by the ISRO, Bangalore.
7. Monthly-recommended check on ELT as recommended by the Manufacture was not being done by the Maintenance agency.
8. The operator also failed to monitor the maintenance activities of the maintenance agency to whom the maintenance contract was awarded.
9. Regional Airworthiness office also did not supervise the maintenance activities of the maintenance agency.
10. Lots of cutting and overwriting were found in the Tech log and log books of the helicopter.
11. Crew selected non-published route for the programme flight wherein no ATC facility exists.
12. Crew was operating the subject sector for the first time.
13. Selection of the route was not proper by the crew as there is no ATC coverage en route and the refueling aerodrome was also not equipped with ATC.
14. HF communication equipment was not fitted on the helicopter and at present HF is not mandatory .
15. No Meteorological briefing was obtained by the crew prior to departure for the planned flight.
16. No meteorological folder was prepared by the met. duty officer for the flight due want of flight levels were not given properly by crew.
17. Helicopter after takeoff remained in contact with the Hyderabad ATC for about 27 minutes and its last position was reported through IAC 941 at 0955 UTC as 60 Miles from Hyderabad.
18. The helicopter was not able to maintain assigned 3000 feet due weather as reported to ATC.
19. While continuing the flight, crew had asked from ATC permission to maintain 1000 feet AOL (Above obstructions all through) and same was approved.
20. No monitoring of flight was carried out by the Hyderabad ATC even after expiry of its ETA for Jagdalpur.

21. Hyderabad ATC came into action at 1420 UTC when a call was received from the operator that their helicopter VT-REO has not landed at Jagdalpur and there is no contact with pilot of the helicopter.
22. ATC, Raipur did not receive the ETA or Flight Plan of VT-REO from none of FIC's or from the Departure Airport, Hyderabad.
23. Search and rescue work was carried out by the operator in association with the Air Force authorities.
24. The area where the accident occurred was not scanned by any team.
25. The Indian Air Force on its own part has been operating and was not making any efforts to synergise the efforts of other operators in search and rescue operations, thus reducing the efficacy of survey.
26. The wreckage of the helicopter was located after about 100 days after the accident.
27. The site of the accident could not be visited by the Inspector of accidents due safety advisory by the State Police in providing security to the team due heavy naxalite activity in that area.
28. The wreckage evidences are derived from the still/ video coverage done by the local people and some components from the accidented helicopter were brought down from the hill for investigation.
29. During the CVR tape transcript the crew was talking to each other about presence of bad weather.
30. The helicopter was on direct route to its destination and there was no deviation found.
31. Route forecast indicated as isolated CB with Moderate to severe turbulence and Mod icing for en route is the forecast issued in TAFORS.
32. The weather was bad and due presence of clouds the crew was descending the helicopter.
33. The crew was flying the helicopter at about 150 kts of ground speed.
34. Crew was probably maintaining the visual contact with the ground and they overlook the presence of hill en route which was located at about 2700 feet. However he should have maintained AOL altitude 1000 feet.
35. Helicopter descended below the minimum safe altitude due presence of bad weather and collided with the hill en route.
36. Total of 132.4 mm of rainfall was recorded by Venkatpuram state authorities on the day of accident wherein accident occurred.
37. The PIC has used net on his blackberry mobile through Airtel GPRS service last time at 15:42 hrs IST on 3.8.2008 and accident took place thereafter.

3.2 Probable Cause of the accident:

Helicopter descended below the minimum safe altitude due bad weather and collided with the hill en route.

Contributory factors:

1. Crew did not obtain the meteorological briefing before departure.

2. Selection of the improper route by the crew.

4. RECOMMENDATIONS:

1. All helicopter operators should include SOP for advising their crew to chose the route, which is under the ATC VHF coverage, and if such route is not possible then HF communication equipment to be mandatory on board the helicopter for relaying its position to ATC.

2. All helicopter operators should advise their crew to obtain the route weather from the meteorological office from the departure station especially before commencing the flight.

3. Search and rescue procedure followed by AAI at present to be reviewed in wake of failure to locate the helicopter.

4. Action as deemed appropriate be taken on the maintenance agency for not carrying out the monthly check as recommended by Manufacturers on the ELT.

5. Action as deemed appropriate be taken on the operator for not monitoring the activities of maintenance agency.

6. AAI should review the existing system of aircraft flight planning and reporting procedure to other destination aerodromes for proper flight follow up.

(M.J. Singh)
Inspector of Accidents
VT-REO

New Delhi
24.4.2009

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