

NO. HQ CAA/1901/235/SIB



CIVIL AVIATION AUTHORITY

**INVESTIGATION IN RESPECT OF ACCIDENT TO PUNJAB
GOVERNMENT BELL-412 HELICOPTER REG. NO. AP-BEA
OCCURRED ON 17TH DECEMBER, 1998**

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LAHORE AIRPORT

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KARACHI PAKISTAN

INVESTIGATION IN RESPECT OF ACCIDENT TO PUNJAB
GOVERNMENT BELL – 412 HELICOPTER REG. NO. AP-BEA
AT LAHORE ON 17TH DECEMBER, 1998

Authority: - Director General Civil Aviation Authority Memorandum No.
HQCAA/1901/235/SIB dated 18th December 1998.

Composition of Investigation Team

- | | | |
|-----|---|-------------------------|
| (a) | Air Cdre (Retd) Jamal Hussain
President SIB, HQ CAA | Investigation In-charge |
| (b) | Lt. Col. (Retd) Saleem Khan
CM Licensing, HQ CAA | Ops. Investigator |
| (c) | Wg. Cdr. (Retd) Zia Ul Haque
Ops. Engineer, HQ CAA | Tech. Investigator |
| (d) | Wg. Cdr. (R) Asghar Choudhary
(On retainer ship), CAA,
Lahore Airport | Med. Investigator |
| (e) | Mr. Zakawat Ul Hassan
Snr. ATCO, Lahore Airport | Ops. Investigator (ATC) |

1. AIRCRAFT INFORMATION

- | | | |
|------|---|--|
| 1.1. | Registration Marking | AP-BEA |
| 1.2. | Aircraft type and maker's serial No. | Bell-412-SP/33201 |
| 1.3. | Engine types, airframe positions
and maker's serial Nos. | PT6-3B Pratt & Whitney Canada.
No. 1 CP-PS- 63162
No. 2CP-PS - 63602 |
| 1.4. | Certificate of registration No. and
validity. | No. 628 Date of Issue 23-12-96
Validity = Till today. |
| 1.5. | Certificate of Airworthiness No.
and date of expiry and Flight
Manual No. | No.580 Date of Expiry 01-11-99. |
| 1.6. | Certificate of Maint date and time
(GMT) of issue and period of validity | No.BEA-17 Date 02-11-98. Valid up
to 01-02-1999. |
| 1.7. | Date of construction of airframe. | 1989 |

- | | | |
|-------|--|---|
| 1.8. | Name and address of owner. | Services & General Administration
Department. Punjab Civil Secretariat
Lahore. |
| 1.9. | Gross Weights. Maximum permitted by C. of A. for this flight, at the time of accident. | Max. Gross Wt. 11900lbs. 10900lbs at the time of accident. |
| 1.10. | Loading. Centre of gravity limits in C. of A. and centre of gravity position at the time of accident and commencement of flight. | Loading Total 10 including crew. Max. permissible is 15.
C.G within limits |
| 1.11. | Airframe History. (Give flying times since manufacture, last overhaul and last periodic check. List also essential modifications completed). | Flying time since manufacture 1204.4 till 16-12-98. No Overhaul. 49.4 hours since Annual Inspection. |
| 1.12. | Engine History. (Give flying time since manufacture, last overhaul and last periodic check. List also essential modifications completed). | Engine No. CP-PS - 63162
Flying Time :1111.5 Hrs
Last Periodic Check at 1085.6 hours.
Flying time since last periodic check: 25.9 Hrs.
Engine No. CP-PS-63602 :
Flying time: 63.9 Hrs.
Last periodic check at 838.0 hours .
Flying since last periodic check : 25.9 hours. |
| 1.13. | Details of operating life and operating time since manufacture and overhaul | N.A. |
| 1.14. | Defects. (List and remark upon any technical defects in airframe, engines or accessories, discovered during investigation). | NIL |

2. CREW INFORMATION

2.1. PILOT-IN-COMMAND

2.1.1. Name: : Maj.® Ejaz Sadiq

2.1.2. Position in the Cockpit: : Right Side

2.1.3. Date of Birth: : 28-11-1949

2.1.4. Type of Licence held and No.: CPL No. 1837 (H)

2.1.5. Medical date with status: :21-09-98 Fit for Flying

2.1.6. Rating:-

2.1.6.1. Type(s) held: —

2.1.6.2. Type current: Bell 412 - Group -1

2.1.6.3 Assist/Flight Instructor Rating NIL

2.1.6.4 Check Rating : NIL

2.1.7. Flying Experience:-

2.1.7.1. Grand Total: 3730

2.1.7.2 Total In Command 3100

2.1.7.3 Total in command
On the type accident/
Incident occurred 250

2.1.7.4. Where trained: Local, Punjnad Aviation.

2.1.7.5 Date of joining the
Organisation June - 96

2.2 CO-PILOT

2.2.1 Name: H/Col.. ® Imtiaz Akhtar Uppal

2.2.2 Position in the Cockpit: Left Side

2.2.3 Date of Birth: 21-12-1947

2.2.4 Type of Licence held and No. CPL-NO. 2090 (H)

2.2.5 Medical date with status: : 21-09-98 Fit for Flying

2.2.6 Rating:

2.2.6.1	Type(s) held	Bell – 206
2.2.6.2	Type current:	Bell 412-SP Group – 1
2.2.6.3.	Assist/Flight Instructor	: NIL
2.2.6.4	<u>Check Rating:</u>	NIL

2.2.7 Flying Experience:-

2.2.7.1	Total:	3290 Approx.
2.2.7.2	Total in Command:	2500 Approx.
2.2.7.3	Total in Command: on the type accident/ Incident occurred.	200 Approx.
2.2.7.4	Where trained	Simulator training in USA
2.2.7.5	Date of joining the Organisation	June – 96

2.3. FLIGHT ENGINEER No Flight Engineer was required on board

3. SUMMARY OF ACCIDENT

- 3.1 AP-BEA, Bell – 412 Helicopter, owned by the Government of Punjab and operated by Askari Aviation took off from Bahawalpur on 17th December, 1998 at 1019 hours UTC (1519 hours PST) on a VFR flight to Lahore. It was an authorised mission by the Government of Punjab to ferry the Prime Minister's Price Control Team. The visibility reported at Lahore and Rahwali, the primary alternate, was 1.1. Km and there was a weather warning for poor visibility, expected to deteriorate below the existing reported visibility conditions. The visibility at Lahore and its surroundings had been reported quite low due to fog especially in the evenings.

- 3.2 The pilot confirmed the weather report from ATC Lahore on telephone before taking off from Bahawalpur. Upon contact with Lahore approach on R/T, 27 miles out of Lahore at 1642 hours, the Radar Controller vectored the helicopter to the final approach path for R/W 36R in anticipation of an ILS approach. The visibility reported at the time was 1 Km. The first two approaches for landing were unsuccessful as the pilots failed to spot the runway. During the final stages of the first approach the visibility had reduced to 200 meters. On the third approach the helicopter was seen right of course and given a correction to turn left heading 350° by the Radar Controller. Instead of turning left, however, the pilot turned right, descended to below 100 feet AGL, struck a pigeon coop situated on the roof of a house with its main rotors, subsequently hit a wall with the skids and later with the tail rotor, resulting in separation of the tail rotor from the helicopter. Once the tail rotor was lost, the helicopter went out of control into a spiral which resulted in the helicopter hitting a water tank and finally crashing in the court yard of a mosque in Bilal Town, Badian Road about 1.2 km short of Lahore Airport.

4. INJURY TO PERSONS

- 4.1 Of the ten occupants on board the helicopter, five were fatally wounded. Three passengers and one member of the crew expired on reaching the hospital, while the co-pilot died in hospital 36 hours later. Four passengers and the helicopter pilot survived the crash but they were seriously injured. They were admitted in hospital and are now out of danger. Three local residents also received minor injuries in the area where the helicopter debris fell. Details of the injuries are attached at Appendix B.

5. DAMAGE TO HELICOPTER

- 5.1 The Helicopter was destroyed.

6. OTHER DAMAGES

- 6.1 On its crash path, the helicopter damaged four walls of different houses, a water tank, a bathroom, mosque pillars and its aluminium doors. List of damages and their claimed assessment is placed at Appendix C.

7. METEOROLOGICAL CONDITION

7.1 Routine weather report of Lahore Airport issued by Meteorological Department at the time of accident and 2 hours preceding are as follows :-

TIME	WIND	VISIBILITY	CLOUD BASE	QNH	TEMP	DEW POINT	R/H
1730	Calm	300 meters	Sky invisible	1015 HPA	12° C	11°	88%
1700	Calm	500 meters	Sky invisible	1015 HPA	13° C	11°	88%
1630	060/02K	1 KM	Nil	1015 HPA	13° C	11°	88%
1600	150/02K	1 KM	Nil	1015 HPA	13° C	11°	88%
1530	150/04K	1.2 KM	Nil	1015 HPA	14° C	10°	78%
1500	150/03K	1.2 KM	Nil	1015 HPA	15° C	10°	73%

7.2 Weather Forecast :

- (a) Initial weather warning issued for Lahore Airport is as under:
- “Visibility over Lahore and Faisalabad is likely to reduce to 100 meters due to mist/fog during period from 0300 to 0600 UTC (0800 to 1100 hours PST)”
- (b) The same warning was extended up to 0900 UTC (1400 hours PST) and further extended up to 1100 UTC (1600 hours PST).
- (c) The warning was issued for further reduction of visibility up to 500 meters due to fog. The validity was 1100 UTC to 1400 UTC (1600 to 1900 hours PST).

Pilots were aware of the foggy weather and had the briefing of actual weather at Lahore Airport. Weather warning for poor visibility was also provided by Lahore Control Tower. They were apprised of the trend of visibility going below 500 meters around sunset at Lahore for the past few days. (Four weather warnings, from 0800 to 1900 hours PST, are placed at Appendix D).

8. NAVIGATION AND LANDING AIDS (VISUAL/NON VISUAL)

8.1

NAV AIDS & LANDING AIDS	STATUS
DVOR/DME	SERVICEABLE
ILS	SERVICEABLE
NDB	SERVICEABLE
PAPI	SERVICEABLE
PRECISION APPROACH LIGHT CAT-2 FOR R/W 36R	SERVICEABLE
R/W EDGE LIGHT THRESHOLD LIGHT TOUCH DOWN ZONE LIGHT, STROBE LIGHT ETC. FOR 36R	SERVICEABLE

9. COMMUNICATION INCLUDING RADIO COMMUNICATION

- 9.1 Frequencies 121.3 MHz of approach and 118.1 MHz of Tower functioned properly. Voice Communication on these frequencies was recorded and transcripts of the recording are attached at Appendix E. Video trace of the path of Aircraft on CSF Thomson Radar, retrieved from video recorder, is also placed at Appendix F.

10. AERODROME AND GROUND FACILITY

- 10.1 Lahore Airport has two runways, 36R/18L and 36L/18R. Runway 36R was in use at the time of accident. The length and width of the Runway is 3360metres and 46 metres respectively

11. FLIGHT RECORDER

- 11.1 AP-BEA, Bell 412 Helicopter was not equipped with Flight Data Recorder and Cockpit Voice Recorder.

12. WRECKAGE & IMPACT INFORMATION

- 12..1 The Helicopter wreckage was located in the courtyard of mosque at Bhatta Chowk on Badian Road. The final stage of the helicopter flight path is shown in a sketch form attached as Appendix S. Main rotor blades were badly damaged & broken due to collision with the pillars of the mosque (Photograph at Appendix T). The main transmission was broken. The front portion was badly damaged due to collision with the walls of houses but the main body of the helicopter was in one piece. The fuel had spilled in the courtyard but there was no fire. The Helicopter skid was picked up from the roof of a house and the tail rotor was found near the place of collision. The Battery was also located away from the wreckage. The condition of the main rotor clearly indicates the rotors being at high RPM. The emergency equipment on board was not utilised because of the nature of crash, however, all required items were on board. The condition of wreckage is shown in Appendix U.

13. FIRE

- 13.1 There was no fire caused due to or as a result of the accident.

14. SURVIVAL ASPECT

- 14.1 The helicopter crashed in such a manner that the left and centre section absorbed the maximum stress. As such occupants seated on the left and in the centre were fatally injured. Those occupying the seats on the right side of the helicopter survived.

15. TEST AND RESEARCH

- 15.1 **Navigation Instruments.** To confirm whether ILS was used on AP-BEA before the crash, it was considered essential to get the read out on the navigation instruments i-e Nav-1 and Nav-2 sets. For this purpose the set was removed from the wreckage and brought to an electronic workshop. Having ascertained that there was no short circuit caused within the circuitry due to the impact of the crash, the two sets were installed on a serviceable Bell-412 Helicopter and power was applied. As one of the two display units was found serviceable, read out from only one navigation set could be obtained. The primary frequency displayed on the serviceable display unit read 109.9 while the secondary frequency was 112.7. 109.9 MHz corresponds to the ILS frequency of Lahore and 112.7 MHz is the Lahore VOR frequency. This meant that at the time of crash the pilots did have at least one of their sets tuned to the ILS frequency. (The primary frequency is the one, which is

currently in use while the secondary frequency is the one which is standby and can be used by pressing one changeover button to become effective).

- 15.2 No facilities for testing electronic sets are available with the CAA. The tests were, therefore, carried out through personal liaison with various organisations like PAF and Agha Khan Foundation.
- 15.3 **Pilots' Blood Test.** Blood samples of both the pilots were sent for laboratory tests. It was confirmed by the Armed Forces Institute of Pathology (AFIP) that there was nothing abnormal like PCO₂ and PO₂ (blood gases), alcohol, extreme hypoglycaemia or opiates/sedatives found in the blood samples. It was also confirmed by the CAA Medical Member of the Investigation Team that the pilots were well rested, not over fatigued and had not resorted to any self-medication during the entire journey. There was also no physiological disorder like hypoxia or dysbarism. Doctor's reports and AFIP laboratory test results are placed at Appendix G.

16. OBSERVATIONS

- 16.1 The pilots of Askari Aviation, flying the Bell-412 Helicopter, were both very experienced in VFR Operations, however, their instrument flying proficiency was questionable. Neither of the pilots had had any formal instrument flying training to their credit and what ever little they seemed to know about instrument flying was what they had picked up during their 'on the job training (OJT)' while they served various organisations. The Captain of the helicopter, whose total experience was over 3200 hours, had no more than fifty hours of instrument flying to his credit. Besides, as per the Captain's statement, he had carried out only four ILS approaches in the 12 months period preceding the crash. Records indicate that a CAA Inspector had never checked out the Captain of the Helicopter on instrument flying. There was also no formal training provided to the pilots on instrument flying during their OJT. Being helicopter pilots they probably felt that the use of ILS, particularly its glide slope function, was not very critical to their operations because once they could align the helicopter with the runway using the course indicator of the ILS, the rest would always be visual flying. They had, therefore, only practised and learnt about the course indicator function of ILS and were ignorant of its glide slope function. This was apparent from the question and answer session with the Captain about the glide slope function of ILS, where his answers about it revealed his lack of knowledge on the subject (Answers to questions No. 9 and 15 Appendix HI).
- 16.2 The contract of Askari Aviation with the Government of Punjab was valid for one year only (Appendix J). The helicopter had remained grounded in 503 Aviation Workshop for over three months for No. 1 engine change and annual inspection. This protracted un-serviceability earned Askari Aviation a letter

of displeasure from the Chief Minister Punjab in November 1998. The advent of an unprecedented spell of foggy conditions coincided with the helicopter becoming serviceable and the receipt of the mission of the Prime Minister's Price Control Team.. Due to poor visibility Askari Aviation had already cancelled a few flights in the past few days. Askari Aviation was conscious of the importance of this task and they were keen to accomplish it to improve their credibility with the Government of Punjab. These factors were to play a role in their decision to operate from Bhawalpur despite unfavourable weather conditions.

17. INVESTIGATION

- 17.1 Askari Aviation maintenance set up was found organisationally well balanced. A detailed analysis of the Helicopter maintenance record shows that since the 300 hours Inspection, the Helicopter had flown 49.4 hours and no major defect was reported during the last 1½ months. The aircraft Tech. Log since 1.11.1998 is placed at Appendix K. The Helicopter was being maintained according to the manufacturer's maintenance manual and qualified engineer (Copy of AME Licence is placed at Appendix L) was carrying out all inspections according to maintenance schedule. The Helicopter had a valid Certificate of Maintenance and a valid Certificate of Airworthiness at the time of accident (Copies of C of M and C of A are placed at Appendix M and N).
- 17.2 An investigation into the condition of the wreckage and the statements of different witnesses has clearly confirmed that the Helicopter was fully serviceable and fit for the mission. The aircrew has also not indicated any defect in any system during the flight. The conditions of the main rotor clearly shows that the engine was running at full power and at the time of impact the rotor blades were at high RPM (Appendix O). This was due to the loss of tail rotor since total engine power was being transmitted to the main rotors.
- 17.3 Askari Aviation operations were found organisationally well balanced. The pilots had valid CPLs and were instrument rated. Both CPL/IR were current and the pilots were medically fit. While the pilots were very experienced in VFR operations, they had limited experience on Instrument Flying. The Captain of the helicopter, Major (Retd) Ejaz Sadiq had 3730 hours of flying of which his instrument flying experience was only 50 hours (Answer to question number 6, Appendix H1). During the 12 months preceding the accident, Major (Retd) Ejaz Sadiq had carried out only four ILS approaches. Neither Major (Retd) Ejaz nor Col. (Retd) Imtiaz Akhtar Uppal (the Co-pilot) had undergone any formal instrument flying training course. They had never been given any formal instrument flying training by any organisation

they had served with and their instrument flying experience was based primarily on OJT they did while being employed with various companies which operated Bell-412 helicopter. Their training, current practice and the resultant proficiency on Instrument flying specially the use of ILS was, therefore, not satisfactory.

17.4 The helicopter was on an authorised mission to ferry the Prime Minister's Price Control Team. It had ten persons on board, including the crew, when it took off from Bahawalpur, which was well within its load limitations. The helicopter was serviceable and all its navigational equipment including ILS was working satisfactorily. The helicopter had no transponder or cockpit voice recorder on board.

17.5 Flight plan from Multan for Bahawalpur and Lahore had been filed at Multan. ATC Bahawalpur filed a fresh flight plan from Bahawalpur to Lahore on behalf of the pilots. The visibility reported for Lahore before the helicopter took off from Bahawalpur was 1.1 KM and there was a weather warning for deteriorating visibility towards the evening. The scheduled time for take off of AP-BEA from Bahawalpur for Lahore was 1500 hours local time. Before take off the pilots had failed to check the visibility of Rahwali, the primary alternate of the helicopter, where the visibility was reported to be 1 KM, with a weather warning for deteriorating visibility in the evening. The helicopter took off from Bahawalpur, despite the weather warning, at 1519 hours with ten occupants on board.

→ 17.6 The journey from Bahawalpur to Lahore was uneventful till the pilots contacted Lahore Approach. The visibility reported by Lahore tower was 500 meters while RVR for R/W 36R was 1000 meters at 1642 hours. The helicopter at this time was 27NM out of Lahore. The helicopter was cleared to descend to 3000 feet and vectored to the final approach path in anticipation of an ILS approach R/W 36R. At 1652 hours (i-e 10 minutes later) the reported RVR by Lahore approach for R/W 36R was 200 meters, tower observation was 500 meters and reducing to 200 meters. At 1654 hours the helicopter was 8 miles from touch down and the pilot confirmed at 1655 hours that he was established on the ILS (Appendix E). Major (Retd) Ejaz Sadiq was on the controls (Statement of Major (Retd) Ejaz Sadiq at Appendix H1 refers). The pilot approached the runway and according to his statement he thought he had spotted the runway briefly but he was not sure. He could not land because, according to him, his speed was high and he was too low. He, therefore, executed a missed approach. The controller asked AP-BEA to clear the R/W to the right after they had initiated a missed approach as he had a Boeing 747 coming in. /

→ 17.7 At this point, Lt. Col. (Retd) Imitaz Akhtar Uppal, the Co-pilot, took over the controls and made the subsequent two attempts. During the second approach while the helicopter was on the base leg and was being manoeuvred for the

final approach, one of the mobile telephones belonging to SSP Abid Qadri received an incoming call which lasted for 36 seconds (Appendix R). Since the helicopter had not yet been placed on the final approach, the use of mobile telephone at this juncture could not have had any adverse affect on the ILS approach. The helicopter was placed in line with the runway at a distance of five miles and in this approach the pilot was unable to establish the glide slope function of ILS even at a distance of 2 miles from touch down (Tape transcript at time 1211 UTC refers placed at Appendix E). At 1713 hours, when the helicopter was almost at the beginning of the R/W the pilot was asked for his altitude passing, he confirmed that he was at 2000 feet. This indicates that either the glide slope function of ILS had not been captured or the pilot was not proficient in the use of ILS. On the pilot's request, they were again vectored for the third time for an ILS approach. The controller also told them that they would not be able to land unless they descended on the final approach. Rahwali weather, where the visibility had dropped to 800 metres, was also passed to the pilots.

- 17.8 The helicopter was vectored to the final approach and positioned 5 miles from touch down for the third approach. At 4.5 DME from touch down the pilots were still trying to establish on the ILS. Without establishing themselves on the ILS, they had started descending and reported 1200 feet over the outer marker at about 3 miles from touch down. The pilot was told to turn slightly left, as he was right of course when the helicopter was seen on the radar 2 miles from touch down. At this point the helicopter reported his altitude as 800 feet, which is less than 100 feet above ground. The last acknowledged call by the pilot was at 1725 hours and the controller told him that he is one mile from touch down and still right of the centre line. There was no acknowledgement of this call and only two clicks were heard on the R/T at 1726 hours.
- 17.9 It was noted from the descent pattern during the third approach that the pilot had not used or did not know how to use the glide slope when flying an ILS approach. The pilot reported he was at 1200 feet, when the radar screen showed his position 3 miles short of touch down point whereas he should have been close to 950 feet if he was flying on the glide slope. Again at the crash site if the pilot had been following the glide slope his height should have been above 300 feet (Appendix V) because the crash site is approximately 1.2 from the touch down.

18. WITNESSES

18.1 The following witnesses were examined :-

- i. Major (Retd) Ejaz Sadiq
- ii. Mr. A.D. Khan Sial
- iii. Mr. Shafiq Ur Rehman
- iv. Mr. Shahid Iqbal
- v. Lt. Col. (Retd) Kamal Khan
- vi. Lt. Col. (Retd) Moazzam Khan
- vii. Col. (Retd) Saleem Nasir
- viii. Mr. Muhammad Ghaffar
- ix. Mr. Hussain Raza
- x. SSP Abid Qadri

18.2 Statements of witnesses are attached at Appendix H1 to H10.

19. DISCUSSION OF EVIDENCE

- 19.1 The available evidences reveal that the visibility conditions throughout the Punjab were poor due to an unprecedented dense fog and the only available fog-free hours were roughly between 1100 hours to about 1600 hours local time. The helicopter was fully serviceable and appropriately equipped for instrument flying. The weather demanded proficiency on the part of the pilots to handle the helicopter under instrument flying conditions. However, both the pilots were *not* proficient in instrument flying especially in the use of ILS. Had either one of them been proficient in flying ILS approaches, the helicopter could have safely landed within the first two attempts, as each pilot had alternately attempted the first two approaches.
- 19.2 Due to want of a dedicated helicopter inspector in the Flight Standards Division of the CAA, no helicopter pilot of the Askari Aviation was ever checked out by CAA. CAA left the task of instrument flying checkout to mutual assessment of pilots within the same organisation (Appendix W), a practice, which can have adverse flight safety implications and should be exercised only as a last resort. Since none of the Askari Aviation pilots were themselves proficient in the ILS and the use of Flight Director, this very important aspect was missed out.
- 19.3 Because the contract given to Askari Aviation was on a year to year basis, and the contract did not cater for all aspects of pilot training, especially simulator training, the aspect of pilot training was not covered comprehensively.

- 19.4 In the light of the earlier prolonged unserviceability of the helicopter, a warning from the Chief Minister, unprecedented spell of foggy conditions and cancellation of a few flights due to fog in the past few days, latent pressures of job insecurity on the pilots had built up. This made them relegate flight safety to take a back seat while promoting mission accomplishment to the forefront.
- 19.5 The original take off time of 1500 hours would have allowed the helicopter to arrive over Lahore at around 1630 hours, well before the deterioration of visibility below 1 km had set in. A safe landing could have been executed under those visibility conditions. Even if the visibility had gone down below operating limits by 1630 hours, enough daylight hours were available to the pilots to attempt to execute an emergency landing in any open field. The twenty minutes delay in the take off time meant that when the pilots failed to establish contact with the runway during the first two approaches, darkness had set in and the option of an emergency landing in any open field was effectively sealed. Landing on unprepared surfaces is not permitted after daylight hours as it can be very hazardous due to unknown obstacles.
- 19.6 After the pilots had failed in their first two attempts to land at Lahore, their decision not to divert to their alternate Rahwali was correct as visibility at Rahwali was fast deteriorating and Rahwali did not have ILS/VOR and Approach Radar Facility that were available at Lahore. In the third attempt, had the pilots maintained the ILS limit of 200 feet AGL till they were overhead the airfield either with the use of ILS or the guidance of radar on request, and once overhead had they initiated a gradual descent till contact with the ground was established, they would have been able to, at worst, execute a controlled crash landing at the airfield with minimum damage to the helicopter and injury to the occupants. The fatal accident could have been avoided.

20. FINDINGS

- 20.1 The operational and maintenance organisation of Askari Aviation was found well balanced and satisfactory. The helicopter was fully serviceable before the crash sequence.
- 20.2 The pilots were medically fit to under take the mission and held valid CPL/IR. (Appendix P).
- 20.3 The mission was authorised.
- 20.4 The helicopter was not over loaded.

- 20.5 The destination and alternate weather at the time of take off was above minima as per SOP of Askari Aviation (Appendix Q). However, there was a weather warning of poor visibility for the evening hours. The last five days record of visibility showed a sudden deterioration of visibility after 1700 hours local.
- 20.6 The planned take off time was 1500 hours, which would have enabled them to land before sunset. However, due to the late arrival of the passengers, the helicopter took off at 1519 hours, which resulted in the helicopter making the first approach around sunset time, which was 1704 hours PST.
- 20.7 The decision not to have cancelled the mission due to late arrival of the passengers was probably due to latent pressures of job insecurity, which made them give preference to mission accomplishment at the cost of flight safety.
- 20.8 The mission from take off to 30 miles short of Lahore airfield was uneventful.
- 20.9 After R/T contact with Lahore approach the helicopter was vectored to the final approach path for R/W 36R in anticipation of an ILS approach.
- 20.10 The visibility reduced from 1000 meter at 1642 hours to 200 meters at 1652 hours.
- 20.11 Major (Retd) Ejaz Sadiq was on the controls for first approach.
- 20.12 During the approach the pilot started his descent without the help of ILS glide slope and in the process, as he entered the fog layer, he aborted the approach and climbed back to 2000 feet indicated. .
- 20.13 For the second approach, the helicopter was given a right turn to accommodate an incoming B747 and was repositioned for a straight in ILS approach from a distance of 5 miles.
- 20.14 The controls were taken over by the co-pilot, Col. (Retd) Imtiaz Akhtar Uppal, after the termination of the first approach, who remained on controls for the rest of the flight.
- 20.15 During the second approach the pilot followed the localizer till he reported over the runway but he maintained an altitude of 2000 feet as a consequence of which he was unable to establish visual contact with the runway.

- 20.16 The Controller advised the pilots at 1717 hours PST that unless they descended, they would not be able to see the runway. At this moment, the pilots reported an endurance of 30 minutes. They were informed about the visibility at Rahwali, which was 800 metres and reducing further. Rahwali was the primary alternate but due to deteriorating visibility at Rahwali and non availability of ILS and approach radar there, the pilots opted to make another attempt at Lahore instead of diverting to Rahwali. Given the existing conditions, their decision to make a third attempt at Lahore, which had all night landing facilities, was correct.
- 20.17 The helicopter was repositioned for the third ILS approach from a distance of 5 to 6 miles.
- 20.18 The pilot started his descent without establishing himself on the ILS. He reported 1200 feet at 3 miles from the runway whereas he should have been above 1600 feet at that distance.
- 20.19 He further reported 800 feet altitude (below 100 feet above ground) at a distance of 2 miles from touch down, whereas he should have been above 1300 feet at that distance. He was also observed slightly to the right of the extended centreline and was given a course correction to turn left to 350 degrees.
- 20.20 The pilots did not acknowledge this call. At this moment the helicopter had descended below 100 feet above ground. The pilots spotted some light to their right and turned towards it. In the process the main rotor collided with the pigeon coop atop a house, which was immediately followed by the impact of skids and tail rotor with a wall. The tail rotor sheared off and the helicopter spiralled out of control, hitting two other buildings before crashing into the courtyard of a mosque.
- 20.21 The local population evacuated the occupants in time and made arrangements for their transfer to the hospitals.
- 20.22 Four occupants expired in the hospital the same day. The fifth occupant, Col Uppal, the Co-pilot, died after 36 hours. The other five occupants received injuries to varying degree. After treatment, they are all out of danger. Three persons on the ground also received minor injuries and were successfully treated in a local hospital.
- 20.23 As a result of the collision/crash, four houses and a mosque were damaged. The helicopter was destroyed.
- 20.24 Despite their current Instrument Rating, the pilots were lacking in Instrument flying experience.

- 20.25 Due to a lack of qualified helicopter flight Inspectors in the CAA no pilot of the Askari Aviation had ever been checked out by the CAA for general and instrument flying proficiency. Col. Kamal Khan (Chief Pilot Askari Aviation) and Col. Uppal were authorised to conduct check out and renewal of Instrument Rating on behalf of CAA.
- 20.26 Col. Kamal Khan conducted Instrument Rating check of Col. Uppal and Col. Uppal carried out Instrument Rating check of Major Ejaz Sadiq. Askari Aviation's pilots themselves conducted their IR checks on mutual basis, which had been authorised by CAA.
- 20.27 Both Major Ejaz Sadiq and Col. Uppal were not proficient on the ILS approach and the use of Flight Director. Even in their Instrument Rating check a complete ILS approach was not flown.

21. CAUSE(S)

- 21.1 **Decision to take off from Bahawalpur for Lahore under marginal weather conditions.** Additionally, there was a weather warning for further deterioration of visibility in the evening hours. For the past four days during the evening and night period, at and around Lahore, visibility had been dropping to very low values (below operating limits) due to fog. Under these conditions, the decision to take off from Bahawalpur for Lahore was wrong.
- 21.2 **Delay in the scheduled take off time.** Take off was originally planned for 1500 hours but due to late arrival of passengers, it got delayed to 1519 hours. Had the helicopter got airborne at 1500 hours it would have reached Lahore by 1630 hours, well ahead of the time when sudden deterioration of visibility from 1000 metres to 200 meters occurred. Even if the visibility had gone down to 200 meters by 1630 hours, the pilots could have exercised the option of making an emergency landing in any open ground because there were patches in the vicinity clear of fog and enough day light was available to make an approach clear of any obstructions. The delay in take off resulted in the helicopter arriving at its destination around sunset and after the two failed attempts to land at Lahore, darkness had set in, which effectively foreclosed the option of making an emergency landing in an unprepared site as avoidance of obstacles on ground at night in an area not surveyed before landing cannot be ensured.
- 21.3 **Unfamiliarity with the on board ILS and the Flight Director and inadequate training/proficiency in flying on instruments.** If either of the two pilots had been trained in the use of ILS/Flight Director or if they were

proficient in flying on instruments under IMC, a safe landing at Lahore Airport was possible, even in the poor prevailing visibility condition.

- 21.4 **Violation of Obstacle Clearance Height (OCH)/ILS limits for RW 36/R.** OCH for RW 36R was 216 feet AGL whereas ILS permits the helicopter to descend to 200 feet AGL within 1 NM of the beginning of the Runway. The mishap helicopter, in an effort to get below the fog level and spot the runway or a clear patch to make an emergency landing, descended below 100 feet AGL 2 NMs short of the runway, collided with the buildings in the vicinity, went out of control and crashed.
- 21.5 **Inadequate Safety Oversight.** Non availability of Helicopter Qualified Inspector in the Flight Standards Division of the CAA led to the delegation of authority of Instrument Rating checks to the Chief Pilots of Askari Aviation. Before delegation of authority to the Chief Pilots Askari Aviation, it was not ensured if they were fully conversant with all the instrument procedures/landing aids installed in Bell-412 Helicopter. In the event Col. (Retd) Kamal Khan, who was the Chief Pilot Askari Aviation and in that capacity he carried out Instrument Rating renewal checks of both late Col. (Retd) Imtiaz Akhtar Uppal and Major (Retd) Ejaz Sadiq when he himself was not fully proficient in ILS procedures. As a result, Askari Aviation pilots were awarded their Instrument Ratings without ensuring their proficiency in flying ILS approaches. This shortcoming was one of the causes that led to the accident.

22. RECOMMENDATIONS

- 22.1 Minimum visibility for VFR operations of Civil Helicopters in Pakistan should be fixed at 1.5 KMs.
- 22.2 Instrument rating check out pilots must ensure that the under check pilot demonstrates proficiency in all navigation/instrument landing aids that are installed in the aircraft/helicopter for which the rating is being awarded.
- 22.3 CAA should have its own Flight Inspector(s) of helicopters so that initial checkout/Instrument Rating missions are not delegated to the operators.
- 22.4 Proper Flight Planning, especially when operating under marginal weather conditions, with special emphasis on all available alternates must be carried out in accordance with ICAO Annex 6.
- 22.5 Local residents whose properties were damaged as a result of the helicopter crash may be compensated as per the assessment given at Appendix C.
- 22.6 Aviation contracts involving provision of services by the operators should preferably be of a longer duration of three years or more so that the operators can invest more on training and safety requirements.