

AIRCRAFT ACCIDENT INVESTIGATION
REPORT ON THE FATAL FLYING ACCIDENT
INVOLVING CESSNA 185 REGISTRATION
NO.AP-BBD OF MESSRS. KHAN AVIATION
WHICH OCCURRED NEAR WATEJI AIRSTRIP.

AUTHORITY : DIRECTOR GENERAL OF CIVIL AVIATION AUTHORITY
MEMORANDUM NO.CAA/1901/18/FS DATED 19.3.1983
(APPENDIX "A").

1. AIRCRAFT INFORMATION:

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| 1.1. Aircraft Type and
manufacturers Serial
No. | CESSNA A 185F SKYWAGON-II
CONSTRUCTOR'S NO.18503724. |
| 1.2. Registration Markings : | AP-BBD (Date of Registration
No.25.5.1980). |
| 1.3. Engine Type,
installation and
Manufacturer's Sl.No. | CONTINENTAL 10-520-D.
installed in the fuselage
nose S.No.572077. |
| 1.4. Propeller Type
Manufacturers No. and
Date of Manufacture: | Mccaulay D2A34C58 constant
speed Constructor's
No.792673
Date of construction: 1979 |
| 1.5. C of R | Valid. |
| 1.6. C of A. | No.506 Valid upto 7.1.1984 |
| 1.7. C of M. | No.00004 Issued on 15.3.83
valid upto 4.4.1983. |
| 1.8. Date of
construction : | 1979. |
| 1.9. Owner. | Messrs. Sattar Aviation Ltd.,
leased out to Messrs. Khan
Aviation. |

2. CREW INFORMATION :

- 2.1. Pilot in Command : Seated in the left seat.
- 2.1.1. Name : Capt. Mohammad Mushahid.
- 2.1.2. Age : 29 years 4 months and
10 days. - Date of Birth
8.11.1953.
- 2.1.3. Licence No.: CPL No.1126/2.
- 2.1.4. Type Rating: Cessna-150.
Cessna-185.
Cessna-172.
- 2.1.5. F.I. Rating: F.I.Rating initial issued
on 21.1.1983.
- 2.1.6. F.R.T.O. Licence: 1717/2 Valid upto 7.7.1983.
- 2.1.7. Medical: Valid upto 06.7.1983.
- 2.1.8. Total Flying Experience: 1534.35 (including PAF flying)
- 2.1.9. Total in Command: 592.00 (excluding PAF Flying)
- 2.1.10. Total in Command of Cessna 185F 582.00 hrs.
- 2.2. Second Pilot: Seated in the right seat.
- 2.2.1. Name. Capt. Asif Aziz Shah.
- 2.2.2. Age: 25 years 11 months 18 days.
Date of Birth : 1.4.1957.
- 2.2.3. Licence: CPL No.1271.
- 2.2.4. Type Rating: Cessna-150.
Cessna-185.
- 2.2.5. FRT0 Lic.No. 1851 Valid upto 7.2.1983.
- 2.2.6. Total Flying Exp:715.00 (including PAF Flying)
- 2.2.7. Total in command: 10.00 (in command under supervision)
- 2.2.8. Total in command Cessna-185. Nil.

3. Brief Description of the Occurrence.

- 3.1. On 18th March, 1983 a Cessna 185F Registration AP-BBD of Messrs. Khan Aviation took off from Karachi International Airport at 1456 LT. The aircraft was on a routine Banner Flying mission over Karachi City. The aircraft was flown by Capt. Mohammad Mushahid and Capt. Asif Shah.
- 3.2. The flight was authorised by the Director General Civil Aviation Authority vide letter No. CAA/AT-1/8-3/81 (KHAN) dated 2nd Jan. 1983 - AERIAL WORK PERMIT FOR THE YEAR 1983. (Appendix "L-6").
- 3.3. The aircraft was approved for Banner Kit and Towing Installation by DGCA vide letter No. AT-1/8-3/81 (KHAN) dated 7th August, 1982. (App. "L-5")
- 3.4. The operator (Khan Aviation) was in possession of a certificate of Airworthiness No. 506 by the DGCA, Government of Pakistan. The C of A was valid from 8th January 1983 to 7th Jan. 1984 (App-L-4)
- 3.5. The operator (Khan Aviation) had obtained "NO OBJECTION CERTIFICATE" from the Commissioner Karachi, to fly a Banner for National Beverages over the city of Karachi from 15th to 22nd Mar. 83 vide their letter No. CK/CNS-1/291/81 dated 14th March, 1983. (App-"L-3").
- 3.6. After getting airborne, the aircraft proceeded to Wateji landing strip for lifting the Banner. The ground party which consisted of Mr. S.M. Tahir Kazmi Engineer Incharge, Khan Aviation, Mr. M.I. Khan, Senior Engineer, Khan Aviation, Mr. Rafiq Hussain Senior Technician, Khan Aviation, and Mr. Abdul Rehman Junior Technician Khan Aviation, had earlier proceeded to Wateji Landing Strip. They reached the landing strip at about 1030 LT. and waited for the aircraft to come for lifting the Banner.

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- 3.7. The aircraft arrived at Wateji landing strip and successfully carried out an aerial lift of the Banner at about 1505 LT. The aircraft was then cleared by Karachi Approach Control to fly to the West of Karachi city, keeping the Railway track to the right maintaining 1000 ft. The aircraft apparently did this Banner flying at 1000 ft. for there are no further instructions given by Karachi Approach Control regarding the height to be maintained. The Banner flying continued till 1732LT when the aircraft called Approach Control and transmitted "presently 7 miles South West of the field. Permission to proceed back to Wateji along the coast line". The aircraft was cleared back to Wateji at 1000 feet.
- 3.8. The aircraft returned with the Banner at 1740LT at Wateji Landing Strip. The ground party gave the signal to the aircraft to drop the Banner which was dropped successfully in the kucha, south of the airstrip, the aircraft flying paralalled to the runway in a West to East direction. The ground party which was standing on the runway then proceeded to the site of the dropped Banner. The aircraft in the meantime turned around and made a low pass over the ground party in an East to West direction. The aircraft passed very low over the ground party estimated at about 10 ft. forcing the ground personnel to flatten down and run helter skelter. The aircraft then made a pattern and made another low pass and then a third pass each time in an East to West direction. Each pass was made at very low height forcing the ground staff to take safety measures. The ground personnel made signals and gestures to the pilots to go back and to stop the unnecessary and dangerous flying. After the third pass the aircraft according to eye-witness account, pulled vertically up, turned left and did a manoeuvre like a stall turn, ended up in a dive from which he could not recover and crashed. (see sketch and reports of eye-witnesses).

3.9. The ground party of Khan Aviation and some people from a nearby Poultry Farm and Wireless Station rushed to the scene of the accident. They found the aircraft in an upside down position with the pilots still inside the smashed cockpit, Capt. Asif Shah was removed from the right seat and appeared to be dead. He had ^{his lap belt on.} Capt. Mushahid was removed from the ~~He had~~ left seat after cutting the lap belt. He was profusely bleeding from the face and appeared to be alive. Neither pilot had his shoulder harness ON. The bodies were put in a jeep which was rushed to Karachi. No injury was caused to any third party as a result of the accident, nor was any damage caused to any third party property as a result of the accident.

3.10. One of the persons who had rushed to the scene of the accident was a wireless operator from the GHAGHAR-WATEJI WIRELESS STATION. Mr. S.M. Tahir Kazmi, Engineer Incharge, Khan Aviation, requested him to pass a message about the crash to the Control Tower and to the office of Khan Aviation, Mr. Javed Khan, the owner of Khan Aviation received the telephone call at 1800 LT. He asked Capt. Khalid and his younger brother Salman Khan to take his car and rush to the site of the crash. They intercepted the jeep just short of Landhi bridge. Since Mr. Kazmi was in a shock and was finding it difficult to drive the jeep, Capt. Khalid and Mr. Salman Khan took over the jeep and continued towards Karachi. At the airport Mr. Javed Khan boarded the jeep and replaced Mr. Salman Khan and the jeep was rushed to Liaquat National Hospital. At the hospital the doctors declared both the pilots dead. Capt. Mushahid's relatives arranged an ambulance and took possession of the body. The body of Capt. Asif was taken to Jinnah Hospital where a blood sample was taken and handed over to Col. Ayooob, after which the body was handed over to the relatives, police formalities duly completed.

4. INJURY TO PERSONS.

- 4.1. The occupants of aircraft Cessna 185 AP-BBD Capt. Mohammad Mushahid and Capt. Asif Shah sustained fatal injuries as a result of the accident. No other person/persons sustained injuries as a result of the accident.

5. DAMAGE TO AIRCRAFT.

- 5.1. The aircraft Cessna 185 Reg Mark AP-BBD alongwith its engine sustained extensive major damage and is beyond economical repair.

6. OTHER DAMAGE.

- 6.1. The aircraft crashed in scrub country on the Southern side of disused Wateji airstrip. There was no damage to any property.

7. METEOROLOGICAL CONDITIONS:

- 7.1 Weather was not a factor in this accident. Weather in the area was clear.

8. AIDS TO NAVIGATION:

- 8.1 Not involved.

9. COMMUNICATION:

- 9.1. Communication was not a factor in this accident.
- 9.2. No difficulty with communication was experienced. There was normal two-way R/T communication between the aircraft and Karachi Control Tower and Approach Control from the time the aircraft got airborne till 1732LT. There was no communication with aircraft when it reached and flew over Wateji and at the time of crash. Last communication was at 1732 LT when the aircraft acknowledged ATC instruction and said "Maintaining 1000 feet along the coast will report WATEJI".

10. AERODROME AND CONTROL FACILITIES:

- 10.1 The aerodrome and ground control facilities at Karachi Airport from where the aircraft took off were not a factor in this accident.

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10.2 The airstrip from which the aircraft picked the banner and subsequently dropped the Banner is a disused landing strip and has not been maintained for a considerable time.

11. FLIGHT RECORDER.

11.1 The aircraft was not fitted with a cockpit voice recorder or Flight Data recorder since this is not a requirement.

12. WRECKAGE:

12.1 The wreckage of Cessna 185 Registration No. AP-BBD was examined at the site of the accident. There was no disturbance of the wreckage and the investigating team examined it and found it in the same condition as it was immediately after the accident. (For details of damage to aircraft see para 21.4 and appendices B-9, B-10, B-11, B-12, B-13 & B15. The location of wreckage was in the immediate vicinity of Wateji airstrip. The aircraft impacted the ground 320 feet away from the edge of the airstrip on a heading of 330°. The final resting place of the wreckage was the Southern edge of the strip. The aircraft finally came to rest in an upside down position. The cockpit and the forward half of the fuselage was completely smashed. The left wing had sheared off and although with the main wreckage, was attached by the aileron control cable and the wing support strut. The right wing was attached with the fuselage. The vertical stabilizer and fin was relatively undamaged having sustained slight damage at the tip, perhaps at the final resting place. The Right Horizontal stabilizer was damaged while the left one was relatively in good shape. The engine had broken off and came to rest about 200 feet from the main wreckage while the nose wheel was also shorn off and came to rest 162 feet from the main wreckage. The left strut and wheel was shorn off while the right strut was thrown forward after breaking off at impact. The right wheel hub had broken on impact and the right tyre came to rest near the main wreckage. The propeller tips broke at initial impact and the propeller along with its spinner broke off shortly afterwards. It was thrown forward and 40 ft. to right of the wreckage trail and came to rest 210 feet from the initial point of impact.

13. FIRE:

13.1 No fire occurred.

14. SURVIVAL ASPECTS.

14.1 The aircraft impacted at a fairly high speed of about 120-130 m.p.h. in an approx 20° dive angle. The impact forces must have been large enough to cause greivous injuries to the occupants. Subsequent to impact the aircraft bounced and rolled and impacted the ground in an upside down position. The main impact at this time was taken by the cockpit and from here on the aircraft has slid on the ground inverted. This crushing of the cockpit made this accident non-surviable. Shoulder harnesses were not being worn though they were installed on the aircraft. It is, however, improbable that the pilots would have survived even if they had been wearing the shoulder harness. They may have survived if the aircraft had not landed in an upside down position subsequent to the first impact.

15. TEST AND RESEARCH:

- 15.1 The engine which had separated from the main wreckage was checked in detail. Although the engine was fairly badly damaged it was possible to check the two Magnetos and seven of the spark plugs. All of them were found serviceable. The fuel distributor was removed and checked on another engine where it was found serviceable and having no blockages. It was evident that the fuel and ignition systems of the engine were in a serviceable state.
- 15.2. When the wreckage was examined fuel was dripping and the fuel cock was correctly selected eliminating the possibility of fuel starvation.
- 15.3 The control cables to and from the various controls were checked and they appeared to be properly rigged. Flaps were seen to have been selected down to about 10° at the time of crash, perhaps in an effort to aid recovery out of the dive or more probably they may have been inadvertantly left down after dropping the banner.
- 15.4 There was no evidence whatsoever to suggest that there was anything wrong with the aircraft technically which could have precipitated the accident.

16. OBSERVATIONS:

16.1 No separate observations are being made in this report. All factors such as employment of Chief Pilot by General Aviation Companies having the experience and age to exert the right influence on other pilots and other relevant points are covered in the main report in some detail. Additionally the necessity for proper autopsy of bodies in the event of fatal accidents is covered under the heading "Human Factors".

INVESTIGATION.

17. INITIAL ACTION:

17.1 On 18th March, 1983 at about 1830 hrs LT. a message was conveyed to the Chief Inspector HQ CAA Air Cdre. (Retd) P.D. Callaghan that a Cessna 185 Reg. Mark AP-BBD had crashed near Wateji landing strip. He alongwith Capt. Farmanuddin immediately proceeded to the scene of the accident.

17.2. At the scene of the accident it was found that the ground party of Messrs. Khan Aviation had removed and carried the crew members in their jeep to Liaquat National Hospital Karachi.

17.3 Although it had become dark it was found that the main wreckage was lying in an upside down position on the southern edge of the strip.

17.4. The aircraft engine was lying at approx. 150 ft. from the main wreckage on the main strip.

17.5. Aircraft pieces were strewn about further south of the main wreckage. The propeller could not be located.

17.6. There was no evidence of any fire having taken place.

17.7. Since darkness had set in it was decided to return back and come in the morning for further investigations.

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17.8. At 2000 hours LT., R.D.C.A.A.(South) made attempts to contact the hospital for informing the medical authorities to detain the dead bodies of the crew for medical examination by Civil Aviation Medical Expert. Liaqat National Hospital was contacted who informed that the bodies have been sent to Jinnah Post Graduate Medical Centre (JPGMC). J.P.G.M.C. emergency informed that only the body of Capt.Asif Shah had arrived. Later it was known that the body of Capt.Mushahid had been taken away by his relatives.

17.9. At about 2230 hrs LT the Chief Inspector HQ CAA contacted Col.(Retd.) S.M.Ayoob and advised him to proceed to J.P.G.M.C. for carrying out the necessary medical examination of the deceased Capt. Asif Shah.

17.10 Col. Ayoob proceeded to JPGMC and arranged for the collection of blood sample. Since nearly six hours had elapsed since the crash the blood in the body had coagulated and no reliable sample could be collected.

18. DETAILED EXAMINATION OF WRECKAGE:

- 18.1 On 19th March, 1983 Air Cdre.(Retd) P.D.Callaghan appointed Capt.Farmanuddin and Wing Cdr.Maqsood Amir on the investigation team. The investigation team proceeded to the scene of the accident and reached the site at about 1000 hrs LT. Detailed examination of the wreckage the impact area and the path taken by the aircraft till it came to a stop, was made. Relevant photographs were taken. Interviews and recording of statements of a couple of eye witnesses of the accident was also done. Relevant position of various aircraft parts along the wreckage trail was measured.
- 18.2. The Ministry of Defence, exercising its right decided to appoint Air Cdre.(Retd) P.D. Callaghan as the Chief Investigator to this accident. Consequently Capt. Farmanuddin was taken off from the Investigating team. This was communicated by the D.G.C.A.A. on 19th March, 1983.

- 18.3. On 20th and 21st March, 1983 Air Cdre. (Retd) P.D. Callaghan and Wg. Cdr. Maqsood proceeded to the scene of the accident and made detailed examination of the wreckage, and ground marks, took photographs of the wreckage and impact area and of the bushes that were instrumental in changing the attitude of the aircraft as it proceeded to its final resting place.
- 18.4. The scene of the accident was examined to establish the attitude and manoeuvres just prior to and at the time of impact and also the attitudes it went through as it traversed the distance from the point of impact to the point where it finally came to a stop. The wreckage was recognizable as being the wreckage of Cessna 185 Registration Mark AP-BBD from the markings on the fuselage. (See App. B-9, B-10, & B-11) The wreckage came to rest essentially in one piece the under-carriage and engine having broken off before the aircraft came to rest. The propeller had also broken off from the engine (See "Appendix-C" Wreckage Diagram)
- 18.5. The ground marks at the point of initial contact were impact marks of the wheels and nose of the aircraft. From an examination of these marks it was established that the aircraft impacted the ground wings level in a 20° dive at high speed (estimated 120-130 m.p.h.). Both the landing gears broke off at impact. The nose dragged along the ground for about 50 feet. Portions of the tip of the propeller were found on the left and the right side of the wreckage trail, indicating that the propeller was rotating under high power at the time of impact. Examination of the propeller and its spinner which was found on the right of the wreckage trail well ahead of this point led to a conclusion that shortly after impact the propeller stopped in a horizontal position. Any slash marks that may have been made by the propeller at initial impact had been covered by subsequent scraping of the nose and the under surface of the aircraft. At about 50 feet from the initial point of impact the left wing struck a bush and about half of the left

aileron (outboard position) was shorn off. At this stage the aircraft had flying speed and was bouncing into the air. The yaw to the left caused by the bush and possibly the lowering of the right aileron because of the left aileron getting caught in the bush and being pulled up, caused the aircraft to start rolling to the left. At about this time the propeller along with its hub broke off. The aircraft rolled to an inverted position and the right wing passed through a bush whilst the aircraft was still in the air. The aircraft landed just beyond this bush in an inverted nose down position with the right wing low. The ground marks show clearly the out-board portion of the wing and the green navigation light lying at this point confirming that it was the right wing which had struck the ground and made this mark. The mark does not show any forward scrape and the marks on the bushes just beyond, indicate that the wreckage yawed towards the right wing turning the aircraft wreckage to an almost East West direction with the direction of motion along the left wing, fuselage inverted. From this point onwards the drag marks lead to the final resting place. Marks on the ground indicated that shortly after the aircraft impacted the ground for the second time, the engine broke off and bounced ahead and to the left of the main wreckage, eventually coming to rest on the airstrip a distance of 200 feet from the main wreckage. The engine cowling came to rest just short of the main wreckage. The empennage was relatively undamaged indicating that the tail unit had been above ground through most of the travel of the wreckage. The top of the fin was damaged as the aircraft finally came to rest. The right tailplane (horizontal stablizer) was bent upwards and it was concluded that this damage probably occurred shortly after initial impact at the time the aircraft yawed to the left when it may have struck a bush. The tail wheel probably sustained substantial damage as the wreckage travelled along the trail but it was finally shorn off due the decelerating forces when

the wreckage came to a sudden stop. The tail wheel was thrown forward due to momentum and it came to rest 162 feet ahead of the wreckage in the same direction. There were no sign of pre or post crash fire. There was no evidence or signs in the cockpit area or on the wings or empennage or on the engine cowling of any bird strike having occurred prior to the crash. The examination of the control cables testified that they were intact and that there was no problem with the controls of the aircraft. The mixture, throttle and pitch levers were fully forward and this though not a positive evidence in view of the extent of damage to the cockpit, indicates that these may have been the position at the time of impact and when we consider the evidence of high speed of the propeller at the impact the above conclusion is more than justified. The flap on the right wing was noted to be about 10° down whereas the flap on the left wing was approx 20° down. The flap on the left wing had sustained damage and the inboard part was broken off but lying in its relative position. The flap control cable of the left flap had broken in tension so the position of the left flap may not be correct. The position of the flap lever appears to in the first slot (i.e. 10° down position) The examination of the engine revealed considerable oil spillage along the path taken by the engine and at the place where it finally came to rest. All damage to the aircraft and the engine was consistent with the damage to be expected from impact and post impact forces of the type it/ sustained.

- 18.6 The cockpit and instrument panel were badly damaged. No useful information could be obtained from the examination of the instruments.

- 18.7. The Journey Log Book and the Aircraft Voyage Report were the two documents retrieved from the wreckage (they were stowed behind the right seat).

19. DOCUMENTS.

- 19.1. The aircraft documents were checked, and relevant details extracted, the details are recorded at paragraph 1 of this report.
- 19.2. No record of any trend or defect was recorded in the aircraft and engine documents that could have possibly been a factor resulting in engine failure or loss of control.
- 19.3. The aircraft and its engine both had valid C of A and the propeller, engine and the aircraft had the approved check No.1 carried out on 15th March, 1983.
- 19.4. The Journey Log Book and the Aircraft Voyage Report were recovered from the wreckage where they were stowed behind the right seat.
- 19.5. The Journey Log Book revealed that the aircraft had been regularly flying almost daily with Capt. Mushahid in command. Only one day before i.e. 17th March, 1983, the aircraft had done a similar Banner towing mission.
- 19.6. Details of the flying experience of Capt. Mohammad Mushahid and Capt. Asif Shah were obtained from records held at the Civil Aviation Authority. These details are recorded in this report at paragraph 2.
- 19.7. Both the pilots were ex-PAF pilots, Capt. Mushahid was a dismissed officer who was court martialled for being absent without leave and for issuing a cheque that was dishonoured by the bank. Capt. Mushahid's record in the PAF revealed that he was also reprimanded for doing unauthorised low flying.

Capt. Asif Shah was released from the PAF on medical grounds. His flying category was lowered due to some Nasal problem. He was, however, thoroughly checked by the Civil Aviation Medical Board and declared fit.

- 19.9. The aircraft crash report (Appendix "E") submitted by the Airport Manager, Karachi Airport had the following enclosures.
- 19.9.1. Tape extract (118.3 to 123.7). (Appendix-"F")
 - 19.9.2. Relevant extracts from local flying Register (Appendix "G").
 - 19.9.3. Relevant extracts from FIO Log. (Appendix "H").
 - 19.9.4. Relevant extracts from Approach Controllers Log. (Appendix "J").
 - 19.9.5. Relevant extracts from Tower Controllers Journal. (Appendix "K").
 - 19.9.6. Copy of Messrs. Khan Aviation letter dated 14.3.1983 together with its five enclosures (Appendix "L-1" to "L-6")
 - 19.9.7. TWR/APP Progress Strips is placed at Appendix-"M",
 - 19.9.8. The flight was filed in the local flying register in which the Banner was to be towed at 3000 feet. No evidence, is available as to whether the aircraft did in fact fly at 3000 feet. A report was received from DFO, PIA, on 30th Mar.1983 that a Cessna aircraft was flying low on 18th March, 1983 over residential area at a height of 500 to 600 feet at about 1700 hrs LT. The report is attached as Appendix "X".
 - 19.9.9. From the tape extract and logs and journals provided by the Airport Manager (Appendices "E" to "L") it was noted that the flight was first cleared to Wateji for Banner pick up and was then cleared to the city along the coast at 1000 feet. At no stage was the aircraft advised to operate above this height. Completion of the banner towing over the city (height of operation over city not known) was done probably at 1000 feet. There is a requirement for operation at 600 m (2000 feet) above the highest point of the terrain or any obstacle thereon, within a radius of 600 meters (2000 feet) of a line extending vertically below the aircraft

Rule 165 of Civil Aircraft Rules 1978.

The ATC had last advised the aircraft to maintain 1000 feet whilst proceeding to the city for Banner towing and had specifically stated to maintain this height till further advice. No further advice came from the ATC and neither did the aircraft check back as to the height that he must jack up to. At 1732 LT the aircraft made a position report and requested a clearance to proceed back to Wateji.

20. WITNESSES.

20.1. The following relevant information was obtained from six eye-witnesses to the accident two witnesses who figured in the transportation of bodies to the hospital and one eye-witness who was the Flight Surgeon.

20.1.1. Mr.S.M.Tahir Kazmi Engineer Incharge of Khan Aviation who was one of ground Banner party at Wateji airstrip stated that the aircraft made three low passes over the ground party and then pulled up vertically, put on left bank and then dashed to the ground. He did not notice any abnormality in the aircraft or its engine. He clearly saw Capt. Mushahid sitting in the left seat.

He asked one of the persons who rushed to the scene of the accident and was wireless operator from the nearby wireless station to convey the message to the control tower and to the office of Messrs. Khan Aviation. (Appendix "O")

20.1.2. Mr.M.I.Khan, Senior Engineer of Messrs. Khan Aviation who was one of the ground banner party at Wateji airstrip stated that the aircraft made three low passes over the ground party and then pulled up put on a left bank and crashed to the ground. (Appendix "P")

20.1.3. When questioned by the investigation team, he stated that he heard no abnormal sound in the engine and that the aircraft did not disintegrate in the air. He stated in detail how the bodies were removed and put in the jeep and rushed towards Karachi City.

20.1.4. Mr. Rafiq Hussain Senior Technicians

Khan Aviation who was one of the ground banner party, stated that the aircraft made very low passes over them passing no more than 10 feet and that they were forced to take safety measures. In reply to questions put by the investigating team he confirmed that the engine sound appeared normal and that they made no signals to the pilots except on the first pass when they waved good bye. In fact he said in the subsequent low passes made by the aircraft they were all trying to save themselves since the aircraft was so low. (Appendix "Q")

20.1.5. In reply to a question to describe the manoeuvres made by the aircraft, he produced a diagram showing the manoeuvres which is placed as Appendix- "N".

20.1.6. Mr. Abdul Rehman Junior technician of Messrs. Khan Aviation who was a member of the ground banner party stated exactly what the other three eye-witnesses had said "The aircraft made three low passes over the banner party and after the third low pass had pulled up vertically, put on a left bank and crashed to the ground". (Appendix "R")

20.1.7. In reply to a question put by the investigating team he said that they did not encourage the pilots to do the manoeuvres and that the day before Capt. Mushahid on a similar mission had not done any such low flying.

20.1.8. Mr. Fazal Hussain S/o Mr. Allah Bachaya of Al-Rehman Poultry Farm located in Railway Colony Ghakhar, stated that he saw the aircraft crash and he rushed to the scene of the accident

and helped in evacuating the second pilot.(App."S")

20.1.9. Mr. Mushtaq Hussain s/o Mr. Ghulam Hussain of Al-Rehman Poultry Farm Railway Colony Ghakhar stated that he saw the aircraft come very low and he thought he was going to land. The ground party he said indicated to the aircraft to go away. The witness have said he saw the aircraft climb put on left bank and crash to the ground. The above two witnesses were totally illiterate and their account corroborates what has been said by the other witnesses.(Appendix "T")

20.1.10. Mr. Javed Khan Managing Director, Messrs. Khan Aviation stated that he was sitting in his office at the Hanger when at 1800 LT he received a telephone call from Ghaghar-Wateji wireless station informing him that his Cessna aircraft had crashed. He informed the tower, who confirmed they had lost contact with the aircraft. He asked Capt. Khalid and his younger brother Mr.Salman Khan to take his car and rush to Wateji airstrip. Fifteen minutes later the two returned in the jeep with the bodies and he replaced his brother Salman and rushed to Liaquat National Hospital.

20.1.11. At Liaquat National Hospital he said the doctor who removed the bodies pronounced them dead. The body of Capt.Mushahid was taken over by his relatives while the body of Capt. Asif Shah was taken to J.P.M.C. for antopsy in an ambulance.

- 20.1.12. Mr. Javed Khan arranged a policeman from Thana post Qasim and made a report about the crash. Mr. Javed Khan also received a call from the Airport Manager, Karachi Airport who asked him to detain the bodies till Col. Ayooob of Civil Aviation Authority Medical Board arrived. Later he said Col. Ayooob arrived took a blood sample and told him that the body could be handed over to the relatives. (Appendix "U")
- 20.1.13. Captain Khalid Rehman who is one of the pilots working for Messrs. Khan Aviation, stated that on 18th March, 1983 he was in the Control Tower of Karachi Airport at about 1450 hours LT., when the aircraft AP-BBD taxied out. Later he said he was informed at 1800 hrs. Lt. by Mr. Javed Khan that the aircraft had crashed.
- 20.1.14. Mr. Javed Khan, Capt. Khalid said, asked him and Mr. Salman Khan to rush to Wateji airstrip. They rushed out immediately and intercepted the jeep carrying the bodies just short of Landhi Bridge. He said that Mr. Kazmi who was driving the jeep requested them to take over as he could not drive anymore. He took over the jeep and drove to the Hangar where along with Mr. Javed Khan they rushed to Liaquat National Hospital. At the Hospital, he said the doctor informed them that both the pilots were dead. (Appendix "V")

- 20.1.15. Col.(Retd)S.M.Ayoob, Chief of Aviation Medicine Civil Aviation Authority stated that on 18th March, 1983 at about 2230 hours LT, he was informed by Air Cdr.(Retd)P.D.Callaghan that a Cessna Aircraft had crashed near Wateji airstrip. He said he was informed that the dead body of Capt. Asif Shah was at J.P.G.M.C. and that he was to proceed to the hospital. He said he went to J.P.G.M.C. and collected a small sample of blood from the body of Capt.Asif Shah. Since the death had occurred, he said, nearly six hours earlier all the blood had coagulated and the sample collected was insufficient for the tests to be conducted.
- 20.1.16. He said the body had received multiple crash injuries resulting in instantaneous death. (Appendix "W")

21. DISCUSSION.

- 21.1. Introduction: The investigators having collected and recorded all the available information and evidence which is considered to have a bearing on the accident involving Cessna 185 aircraft of Messrs. Khan Aviation Registration Marking AP-BBD which occurred near Wateji airstrip on 18th Mar.1983 have considered the evidence in its entirety so as to arrive at conclusions as to the probable cause/ causes of the accident and have recommended measures aimed at the prevention of similar accidents in future. However, before these

conclusions and recommendations are recorded it is considered necessary for the benefit of reviewing authority, to discuss the major aspects of the circumstances of the accident in greater detail so that the reasoning employed by the investigators in arriving at their conclusions and recommendations may be better understood.

21.2 Time of Accident.

The last communication with the ATC was at 1732 hrs LT. At 1747 the ATC asked the aircraft to report position but there was the reply. At 1800 LT a wireless operator from the Ghaghar Wateji wireless station rang up Mr. Javed Khan at the airport Hangar office and informed him that his Cessna aircraft had crashed. This would mean that the accident had occurred between 1732 LT and 1747 LT. From the statement of witness Mr. M. I. Khan, Senior Engineer Messrs. Khan Aviation it is recorded that the aircraft arrived back to Wateji for Banner drop at 1740 hrs. LT. Assuming that he took another 1 minute to drop the banner and 3 minutes to do the ensuing low flying manoeuvres, the time of crash can be fairly accurately placed as 1744 hrs. LT.

21.3. Flight of Aircraft.

21.2.1. From the statement of various witnesses, the Airport Manager's report, the tape extract, and the local flying register it is known

that the aircraft Cessna 185 Reg. Mark AP-BBD was on a correctly authorised banner Towing publicity mission. The aircraft took off from Karachi Airport at 1456 hours LT. with Capt. Mushahid CPL No.1126/2 Chief of Pilot of Khan Aviation in the left seat as pilot in command accompanied by Capt.Asif Shah CPL No.1271 in the right seat.

21.3.2. After take off the aircraft was cleared to proceed to Wateji at 3000 feet and below. They carried out an Aerial pick up of the banner at about 1505 hrs. LT. After successfully picking up the banner he was cleared to the west of Karachi city for banner flying along the railway track, keeping it on the right and maintaining 1000 feet till further advised. After read back and confirmation no further communications were exchanged till 1732 hrs. LT., when the aircraft reported its position 7 miles south west of the field and requested permission to proceed back to Wateji along the coast. He was cleared as requested and asked to maintain 1000 feet. The aircraft confirmed maintaining 1000 feet along the coast stating that he would report at Wateji. This was the last radio transmission heard from the aircraft.

21.3.3. The aircraft was spotted by the ground party at 1740 hrs. LT. They signalled to the aircraft to drop the banner. The banner was successfully dropped at the southern side of the runway. They proceeded to retrieve the banner and whilst in the process the aircraft returned from the East flying to the west and flew very low over them

at a height estimated between 10 to 15 feet. The Aircraft after circling made a similar low pass and repeated it yet again a third time. After the third low pass the aircraft was observed to pull up to a nearly vertical attitude and made a left stall turn ended up in steep dive and struck the ground.

21.3.4. Examination of the scene of the accident and the wreckage indicated that the aircraft struck the ground on a heading of 330° at high engine power in wing level 20° nose down attitude. The speed of the aircraft at impact and subsequent travel of the wreckage are indicative of high speed at impact, thus it is concluded that the aircraft was not stalled or spinning when it struck the ground. The impact marks were indicative of an aircraft pulling out from a dive. Bearing in mind the observed manoeuvres of the aircraft prior to impact and the impact attitude as derived from the initial impact marks it is concluded that the pilot entered a manoeuvre at an altitude from which recovery was not possible.

21.3.5. The condition of the propeller and the fact that the tips of both blades had broken off are indicative of high propeller speed under power at the time of impact. It was noted also, that the throttle, mixture and pitch levers were fully forward. Examination of the engine revealed no signs of pre-impact failure. All damage to the engine and propeller were of a type that indicated the engine under full power or high power at the time of impact.

21.3.6. Witnesses who were experienced engineers and familiar with aircraft operations indicated that no failure of the engine or airframe occurred prior to impact. Examination of the wreckage confirmed that the aircraft was complete at the time of impact and no parts had fallen off or failed earlier in flight.

21.4. BREAK UP OF THE AIRCRAFT AFTER IMPACT.

21.4.1. Examination of the wreckage and the ground marks led to the following conclusions concerning the further break up of the aircraft (see Appendices "B", "C", and "D").

21.4.1.1. On initial impact both tyre-tubes burst. The left landing gear spring, strut, tyre along with the wheel hub broke off and was thrown forward, subsequently coming to rest 210 feet from the initial point of impact.

21.4.1.2. The starboard spring strut also broke and was thrown forward. The hub of this wheel broke into pieces, parts of which were found along the wreckage trail from the point of initial impact. Tye tyre was thrown forward.

21.4.1.3. At the initial impact the propeller tips broke off and were found on both sides of the wreckage trail near the initial point of impact. Shortly after impact, the propeller and its Hub broke away and landed ^{40 ft. to} the right of the wreckage trail and 210 ft. from the initial impact.

21.4.1.4. Slightly ahead of the main impact point (50 feet) the right wing passed through the top of a bush cutting off some thin branches and immediately ahead the left wing was caught by a bush which slewed the aircraft to the left and at the same time part of the left aileron got caught, pulled up and torn off. This part of the aileron was found near this point. Since the aircraft still had flying speed this slewing action combined with raising of the left aileron and lowering of the right aileron, as a result, caused the aircraft to commence rolling to the left as it bounced into the air. The aircraft eventually ended up inverted in the air at a distance of 130 feet from initial impact point. The right wing of the inverted aircraft passed through a bush and slightly beyond this the aircraft struck the ground, the right wing top surface leaving an imprint alongwith the green Navigation light. At the same time as the wing struck, the aircraft was in a nose down altitude. The engine struck the ground and broke off and took a path to the left of the main wreckage trail coming to a halt about 200 feet from the main wreckage.

21.4.1.5. The right wing of the main wreckage was caught by another bush just ahead of the point where the aircraft had landed inverted. This slewed the aircraft towards the right wing and forced the aircraft to scrap along the ground

with the fuselage in roughly E/W direction and the motion along a heading of 330⁰. Whilst the aircraft was skidding it was doing so on the top surface of the wings and the cockpit, leaving absolutely no chance of survival for the occupants.

21.4.1.6. After skidding for 110 feet the aircraft was arrested to a sudden halt by a large bush. At this time the tail wheel which had already been damaged got free due to the large forces of deceleration, was thrown forward coming to rest 162 feet from the main wreckage in the same direction.

21.4.1.7. At the very last when the aircraft came to a halt, the fin contacted a mount and got damaged.

21.4.1.8. Damage to the right horizontal stabilizer probably occurred when the aircraft slewed after the left wing got initially caught in the bush shortly after impact.

21.5. USE OF SHOULDER HARNESS.

21.5.1. From the evidence of the witnesses it is clear that both pilots were only wearing their lap belts at the time of the accident, although shoulder harnesses were installed in the aircraft. It is considered that wearing of shoulder harness though possibly not in this accident, could result in better chance of survival during an accident. It is highly improbable that the wearing of shoulder harness in this accident would have saved the occupants in view of the aircraft having turned up side down.

21.6. USE OF HELMETS.

21.6.1. Flying clubs and General Aviators are the operators of light aircraft. We have had a number of accidents over the years where pilots have killed themselves primarily due to head injuries. It may be worthwhile for pilots in light aircraft to wear helmets of the type worn by motor cyclists or parachutists. In this accident also there is a possibility that Capt. Mushahid who was profusely bleeding from the face may have survived if he was wearing a helmet.

21.7. FIRE.

21.7.1. There was no fire either before the impact or after the impact.

21.8. FUEL.

21.8.1. Though the engine was operating at the time of impact the investigators considered the adequacy or otherwise of fuel. At the time of take off the aircraft had six hours of fuel. The aircraft actually flew two hours and 48 minutes. Additionally fuel was found dripping from both the wing tanks 24 hours after the accident.

21.9. FLIGHT CONTROLS.

21.9.1. At the wreckage the flight controls were checked and the control cables were found to be complete and despite distortion were still routed correctly. This observation along with the observed manoeuvres of the aircraft and the fact that the aircraft was attempting to pull out from a dive at the time of impact rules out any possibility that a flight control failure was a cause or a contributory cause of the accident.

21.10. HUMAN FACTORS.

21.10.1. It is important in every investigation into an aircraft accident and especially in the case of fatal accidents to consider the involvement of Human Factors as a cause or contributing cause to the accident. In so far as the flight crew are concerned the Medical Examination has the objective of determination of Medical facts as major or minor factors in the cause of the crash. The points covered are :

1. Physical defects: Medical background, cardiovascular, neurological, respiratory etc.
2. Chemical Findings: Alcohol, drugs, carbon monoxide, lactic acid, insecticides.

21.10.2. The Flight Surgeon Col. S.M.Ayoob was informed very late about the crash and when he reached JPGMC he could take a very small amount of blood from the body of Capt. Asif Shah. This was insufficient to carry out the tests.

21.10.3. In this case the accident occurred very close to major hospitals of a major city. Most accidents will occur in areas both remote and inaccessible by road and other surface means of communication. It is imperative that rescue helicopters with para-medical staff be available at all major airports so that expeditious evacuation and medical treatment can be furnished. Furthermore equipment for

Radio communication directly between the major hospitals and the rescue helicopter needs to be established so that the hospital is ready to receive the injured persons while the helicopter is bringing them. In this accident Capt. Mushahid was alive when he was evacuated. It is quite possible that he could have been saved if there had been a helicopter to effect a rescue. The long ride back on a jeep may very well have killed him in the condition that he was.

21.11. EXPERIENCE OF AIRCREW.

21.11.1. Capt. Mohammad Mushahid was an Ex-PAF Officer. He was a qualified flying instructor with a "C" category and held a green instrument rating. In the PAF he had 900.15 hours of which 424.15 hours were instructional. Capt. Mushahid joined Messrs. Khan Aviation in October 1981. In the Civil he did 592.00 hrs. 582.00 hours were flown on Cessna 185 and 10.00 hours on Cessna 150. His grand total of flying hours was 1534.34 hours. Capt. Mushahid had attained his flying Instructor rating in the Civil on 21.1.1983. Capt. Mushahid had done 42.00 hours of night flying on Cessna 185 and had carried out 85.55 hours of instrument flying on the aircraft as well. Capt. Mushahid was a fully licenced pilot and had a valid Medical.

21.11.2. Capt. Asif Shah was also an Ex-PAF Officer who had done 629.50 hours in the ^{a white} PAF and had Instrument Rating. On Cessna 185 he had 10.00 hours and he was flying in command under supervision. He was a fully licenced pilot and had a valid medical.

Capt. Asif Shah joined Messrs. Khan Aviation only a month back on 15.2.1983.

22. CAUSE OF THE ACCIDENT.

From the foregoing investigation and discussion the investigation has not disclosed any pre-impact malfunction or failure of any system, and has ~~reached~~^{indicated} nothing to suggest engine or control malfunction prior to impact. Based on all of the available evidence, it is the opinion of the investigators that the accident resulted from a breach of flying discipline by the pilot-in-command, who descended to and manoeuvred at a very low level when not authorised for such a flight. The pilot-in-command attempted manoeuvres beyond his experience and ability, and during the low flight and manoeuvring the pilot at the control, failed to maintain aircraft control and entered a manoeuvre at a height from which he could not recover.

FINDINGS.

23. From the foregoing investigation and analysis the investigators are of the opinion that :-

- 23.1. The aircraft Cessna 185F Reg. Mk. AP-BBD owned by Messrs. Sattar Aviation Ltd., and leased to Messrs. Khan Aviation, which was involved in the flying accident that occurred near Wateji airstrip on 18th March, 1983, was fully serviceable prior to take off for the banner towing mission.
- 23.2. At the time of take off the aircraft had in its fuel tank adequate quantity of fuel for the authorised flight.
- 23.3. After the accident the fuel remaining in the fuel tanks was adequate to sustain engine operation under normal flight conditions.

- 23.4. The accident occurred at 1744 hours LT.
- 23.5. The manoeuvres executed by the aircraft and the aircraft configuration on impact vis-a-vis flap position and account of eye-witnesses are not indicative of an attempted forced landing.
- 23.6. The engine was operating at high power when impact occurred.
- 23.7. No bird strike occurred prior to crash.
- 23.8. No pre-impact failures of the engine, flight controls or airframe occurred.
- 23.9. The flight and engine control were being manipulated moments prior to final impact, ruling out total incapacitation of flight crew.
- 23.10. Just prior to impact the aircraft pulled up steeply from low altitude, put on a left bank did a stall turn entering a dive from which he could not recover due to insufficient height.
- 23.11. The speed at impact was estimated at 120-130 m.p.h.
- 23.12. The aircraft impacted the ground wings level in a 20° dive angle.
- 23.13. No Fire Occurred.
- 23.14. The two occupants Capt. Mohammad Mushahid and Capt. Asif Shah sustained fatal injuries.
- 23.15. The two occupants Capt. Muhammad Mushahid and Capt. Asif Shah were medically fit prior to take off, were qualified and suitably licenced for the flight authorised.
- 23.16. Shoulder harness for both occupants were installed in the aircraft Cessna 185 Reg. Mark AP-BBD. Neither of the occupants were wearing them at the time of the accident.

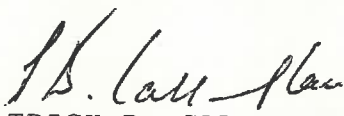
- 23.17. Both occupants were wearing lap belts at the time of the accident.
- 23.18. The two bodies were removed. Capt.Asif appeared to be dead while Capt.Mushahid, who was bleeding profusely from the face appeared to be alive.
- 23.19. The bodies were taken in a jeep to Liaquat National Hospital where they were both declared dead on arrival, by the doctor.
- 23.20. No proper autopsy on the bodies could be conducted as the body of Capt.Mushahid was taken away by his relatives on the assurance of some D.I.G. and when blood was removed from the body of Capt. Asif Shah so much time had elapsed that the quantity obtained was insufficient for tests.
- 23.21. From the records and on inquiry from PAF it came to be known that Capt. Mushahid was a dismissed officer from the PAF having been Court-Martialled for being A.W.O.L. and for having issued an invalid cheque. In addition he was once reprimanded for doing unauthorised low flying in the PAF.
- 23.22. The age and experience of Capt. Mushahid who was the Chief Pilot of Messrs. Khan Aviation was not sufficient to hold such an appointment.

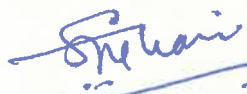
RECOMMENDATIONS.

24. In consideration of the findings made in this investigation the following recommendations are made:-
- 24.1. In the event of any accident/incident occurring as a result of breaches of flying discipline exemplary punishments may be given to curb this tendency.
- 24.2. For the approval of appointments of CFI Flying Clubs, Chief Pilot General Aviation Companies and D.F.O's of Airlines, careful consideration should be given to the age, experience and past history both in Civil and in the Armed Forces, if any.
- 24.3. A review of the already approved incumbents for the posts mentioned in para 24.2 be made to ensure that they are suitable.
- 24.4. It should be mandatory for pilots of Flying Clubs and General Aviation Companies to wear shoulder harness wherever they are provided.
- 24.5. Consideration may be given to the mandatory wearing of helmets by light aircraft ^{Pilot} operators. ✓
- 24.6. The ATC should ensure that in the event of similar banner flying operation over the city, the requirements of Rule 165 (as to operating altitudes) of Civil Aviation Rules 1978 are complied subject to any special clearance given by the D.G.C.A.A.. When such operations are being conducted the ATC should require that the aircraft pass its position and altitude at regular intervals of time.

- 24.7. Airport Managers should be instructed that in the event of fatal flying accidents occurring in their jurisdiction, they ensure that proper autopsy on the bodies is conducted preferably with a Aviation Medical Specialist in attendance.
- 24.8. Clear instructions are to be given to Airport Managers that in the event of fatal aircraft accidents occurring in their jurisdiction they should invariably inform the Chief Aviation Medical Specialist C.A.A. and obtain his advice.
- 24.9. The pilots of General Aviation Companies and Flying Clubs should be regularly check flown by C.A.A. Officers (pilots) so as to ensure standardization and an adequate flying ability level.
- 24.10. The possibility of providing rescue helicopters at each of the major airports should be considered. Para-medics teams for rescue purposes may be trained to travel on the rescue helicopter when on an actual rescue operation. The helicopters should be properly equipped with radio link to major hospitals. Alternatively PAF / Army / Navy Helicopter Rescue Facilities may be used.


(MAQSOOD AMIR)
Wing Commander
Technical Investigator.

 31/3/83
(PATRICK D. CALLAGHAN)
Air Commodore (Retd)
Investigator In-Charge


(S.A. KAZMI)
Group Captain
President A.I.B.
Flight Safety Directorate
A.H.Q. Peshawar.

APPENDIX "B12"



THIS IS A VIEW OF THE COCKPIT TAKEN FROM THE RIGHT
INSTRUMENT PANEL AND THE ENGINE



A VIEW OF THE WRECKAGE FROM THE LEFT SIDE SHOWING THE LEFT WING, THE TORN LEFT AILERON AND FLAP. THE BUSHES WHICH HAVE ARRESTED THE AIRCRAFT ARE CLEARLY VISIBLE.

THE REGISTRATION MARK CAN CLEARLY BE SEEN. NOTE THE POSITION OF THE FLAP.

APPENDIX "B10"



A VIEW OF THE WRECKAGE FROM THE LEFT HAND SIDE.
MOST UNDA MAGED CONDITION OF THE FIN RU

APPENDIX "B9"

N



THE VIEW OF THE MAIN WRECKAGE WHERE IT CAME TO REST
NOTES THE DAMAGE TO THE COCKPIT AND THE RIGHT TAIL

THE REGISTRATION MARK CAN CLEARLY BE SEEN. NOTE THE POSITION OF THE FLAP.

APPENDIX "B10"



A VIEW OF THE WRECKAGE FROM THE LEFT HAND SIDE.
MOST UNDA MAGED CONDITION OF THE FIN RU

APPENDIX "B9"

N



THE VIEW OF THE MAIN WRECKAGE WHERE IT CAME TO REST
NOTES THE DAMAGE TO THE COCKPIT AND THE RIGHT TAIL

APPENDIX "B-13"



A VIEW SHOWING THE DAMAGED HULLS AND THE DEBRIS



A VIEW OF THE WRECKAGE FROM THE LEFT HAND SIDE.
NOTE THE ALMOST UNDAMAGED CONDITION OF THE FIN RUDD
THE LEFT TAIL PLANE AND ELEVATOR. NOTE THE MISSING
TAIL WHEEL.



THE VIEW OF THE MAIN WRECKAGE WHERE IT CAME TO REST
NOTE THE DAMAGE TO THE COCKPIT AND THE RIGHT TAIL F
THE REGISTRATION MARK CAN CLEARLY BE SEEN. NOTE THE
POSITION OF THE FLAP.

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APPENDIX "B-13"



A VIEW SHOWING THE ENGINE MOUNTS AND THE DAMAGED