

CIVIL AVIATION AUTHORITY

KARACHI, PAKISTAN

AIRCRAFT INCIDENT INVESTIGATION REPORT

**INFLIGHT INCIDENT OF ROUTE VIOLATION BY PIA
BOEING 747 REG. MK AP-AYW ON 24TH SEPTEMBER 1992
WHILST OPERATING ON A SCHEDULED INTERNATIONAL
FLIGHT FROM LAHORE TO RIYADH.**

Authority: Director General Civil Aviation Authority Memorandum
No.HQCAA/1133/3/ATS Karachi dated 3rd October,1992
(Appendix "A")

COMPOSITION OF INVESTIGATION TEAM

- | | | |
|----|--|------------------------|
| a) | Malik M. Akram Khan
General Manager Air Transport | Investigator-in-Charge |
| b) | Wg. Cdr (R) Suhail Ismail
Corporate Manager (Examination) | Investigator |

1. AIRCRAFT INFORMATION

- | | | |
|------|---|--|
| 1.1. | Registration Marking | AP-AYW |
| 1.2. | Aircraft type and maker's Sl.No. | B-747-200
MFG. SL. NO.21035 |
| 1.3 | Engine types, airframe positions
and maker's serial Nos. | JT9D : Engine
No.1:686 026
No.2:685.959
No 3:695.734
No.4:686.092 |
| 1.4. | Certificate of registration
No. and validity. | No. 495 Issue date
April 29, 1980 in the
name of PIAC. Previous
C of R was issued on
April 28, 1976 in the
name of TAP. |

- 1.5. Certificate of Air worthiness
No. and date of expiry. No. 448/1
Date of Expiry:
07-07-1993
- 1.6. Certificate of maintenance
date and time (GMT) of issue
and period of validity. Certificate of main-
tenance was signed
on 17-9-92 (After
every 450 flying hrs).
- 1.7. Date of Construction of
airframe. October, 1975
- 1.8. Name and address of owner PAKISTAN INTER-
NATIONAL AIRLINES
CORPORATION,
KARACHI AIRPORT,
KARACHI.
- 1.9. Airframe history. (Give flying
time s since manufacture, last
overhaul and last periodic
check. List also essential
modifications completed). TAF:52689:24
MAJOR CHECK (D) ON
30.4.1989.
FA CHECK ON 17.9.1992
- 1.10. Engine history. (Give flying
time since manufacture, last
overhaul and last periodic
check. List also essential
modifications completed).
- | ENGINE | TSN | CNS |
|--------|----------|-------|
| NO.1 | 36325:43 | 10931 |
| NO.2 | 47863:04 | 11327 |
| NO.3 | 35727:21 | 10732 |
| NO.4 | 34007:04 | 10427 |

2. CREW INFORMATION

2.1. PILOT IN COMMAND

- 2.1.1. Name CAPT. MUMTAZ PIRACHA(ALTP 225/2)
- 2.1.2. Position in the Cockpit Captain
- 2.1.3. Date of Birth 28-9-1933
- 2.1.4. Type of Lic.and No. ALTP No. 225/2
- 2.1.5. Medical date with
status Fit for renewal of ALTP Lic.To keep
control on weight. Subject to use
of corrective glasses.

2.1.6. RATING	
2.1.6.1. Type (s) held:	F-27, B-707/720B, Trident-IE, DC-10, A-300 and B-747.
2.1.6.2. Type current	B-747
2.1.6.3. Flt. Instructor Rating.	Nil
2.1.7. FLYING EXPERIENCE	
2.1.7.1. Grand total	14739.00
2.1.7.2. Total-in- command	10707.44
2.1.7.3. Total-in- command on the type B-747	2845.00
2.1.8. Where trained	PIA
2.1.9. Date of Joining the Org.	1958
2.2. <u>FIRST OFFICER</u>	
2.2.1. Name	RUVI ZAMAN
2.2.2. Position in the Cockpit	First Officer
2.2.3. Date of Birth	15.5.1953
2.2.4. Type of Lic. and No.	ALTP Lic No. 700
2.2.5. Medical date with status	Fit for ALTP Lic renewal Advice to have two orthopedic surgeons opinion in next medical.
2.2.6. RATING	
2.2.6.1. Type (s) held	F-27, Twin Otter, B-707/ 720B, A-300 and B-747
2.2.6.2. Type current	B-747

2.2.6.3. Flt.Instructor
Rating. Nil

2.2.7. FLYING EXPERIENCE

2.2.7.1 Grand total 7489.10

2.2.7.2.Total-in-
command 2139.35

2.2.7.3. Total co-pilot on
the type accident
incident occurred. 515.30

2.2.8. Where trained. PIA

2.3. FLIGHT ENGINEER

2.3.1. Name MIR TARIQ YAKUB

2.3.2. Position in
the cockpit Flight Engineer

2.3.3. Date of Birth 14.06.1946

2.3.4. Type of Lic
and No. Flight Engineer's Lic No. 121

2.3.5. Medical date
with status 10-10-1991 (FIT)

2.3.6. RATING

2.3.6.1. Type (s) held 707/720-B, A-300, Dc-10

2.3.6.2. Type current B-747 (2,836;23 hrs)

2.3.7. FLYING EXPERIENCE

2.3.7.1. Grand total 10,534:00 hrs

3. SYNOPSIS

- 3.1. Aircraft Boeing 747 AP-AYW was on a scheduled International flight from Lahore to Riyadh. During the pré-departure preparation of the navigation equipment, the pilots instead of selecting a radial of 231 degrees, selected 321 degrees on their Flight Director Systems, because of which the aircraft after take-off went in direction about 90 degrees away from the planned Air Traffic Services (ATS) route.
- 3.2. Sector Operation Centre (SOC) PAF located an unidentified aircraft on its radar en-route from Lahore to Islamabad. After confirmation from Lahore Flight Information Centre (FIC) of no known scheduled air traffic on this route. PAF scrambled fighter aircraft which identified the PIA Boeing 747 .
- 3.3. The crew realized their mistake after about 27 minutes of flight at about Risalpur and altered course for correction to get back on the planned ATS route. They resumed normal navigation and landed at destination Riyadh without any further eventuality.

4. METEOROLOGICAL CONDITION

- 4.1. Met report from Lahore is attached as Appendix "C-12". It is not a contributory factor in this incident.

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

- 5.1. Aircraft Navigation and Landing Aids were available and serviceable. They were not a contributory factor in this incident.

6. COMMUNICATION AND GROUND BASED NAVIGATION AIDS.

- 6.1. All communication and navigation aids were serviceable and are not a contributory factor in the incident.

7. **COCKPIT VOICE RECORDER**

- 7.1. The reading of cockpit voice recorder was not available for investigation.

8 **INVESTIGATION**

- 8.1. A telex message from Karachi FIC was originated at 1855 UTC on 24th September, 1992 that a PIA aircraft PK-727 had violated ATS route. HQ CAA immediately issued a signal to Airport Manager (APM) QIAP, Karachi, APM Lahore, and APM Multan to investigate and submit a report. The reports along with annexures are attached as appendix B, C & D respectively.
- 8.2. AHQ was requested on 27th September 1992 to provide radar pick up trace, which was received on 3rd October 1992 and is attached as Appendix "E". Reports of violation and route followed by PK-727 were also received from the North, Central and Southern Air Commands.
- 8.3. Director Flight Operation (DFO) PIA was asked by President Safety Investigation Board CAA to conduct an inquiry into the violation of route by PK-727. Before the report of DFO PIA could be received an Investigation team was formed by DG CAA to Investigate the incident.
- 8.4. The cockpit crew was grounded from flying duties under Civil Aviation Rules, 1978, Rule 311 for the period of investigation to ensure their availability.
- 8.5. The Pilots, and flight Engineer appeared before the board on 5th October 1992. Their statements were recorded and question/answer session was held with them. The Duty Air Traffic Controller Lahore also appeared as a witness and recorded his statement on 10th October 1992.
- 8.6. Flight Operations Manual (FOM), Standard Operating Procedures (SOPs) and Flight Crew Operating Manual (FCOM) were consulted as and where required. Relevant portions of FOM and SOP's are attached as appendix "L" and "M" respectively.

- 8.7. The Cockpit Voice Recorder (CVR) reading would have provided useful information and helped in investigating the activities in the cockpit which resulted in the violation of Air route. The recording erases after 30 minutes unless the circuit breaker is pulled by the Captain.

9. **DISCUSSION OF EVIDENCE**

- 9.1. Departure briefing is required to be conducted by the Captain with the First Officer and Flight Engineer. This briefing besides other things is to cover the anticipated departure procedures and the desired NDB, DME, VOR and other frequencies to be used.
- 9.2. The Flight Crew Operation Manual (FCOM) require that both pilots are to conduct silent cockpit checks during which they also set their respective flight control panels.
- 9.3. To facilitate in navigation, the aircraft is equipped with VORs, DME's, NDB's and three Inertial Navigation System (INS), plus weather radar. By correct use of these facilities/aids pilot can determine his exact position over the ground, the time and distance to different way points, deviation/correction from the planned route, the wind direction and speed at his level of operations.
- 9.4. Coordinates of 9 way points can be fed into the INS at a time. According to the flight plan (Appendix G) the initial 9 way points were Lahore, LEMOM, MOLTA, RAHIM YAR KHAN (RK) ZEMKO-SHANO-PANJGUR (PG) - JIWANI (JI) & EGRON. In accordance with the SOP's all 9 way points are to be inserted in the INS.
- 9.5. ATC clearance is obtained from the tower by the first officer during taxi. In this clearance the pilot is given the departure procedure to be followed, height and other limitations may be imposed, as considered essential by the ATC. The first officer notes down the clearance and other crew members are required to cross check with the flight control panel that the correct departure procedures have been selected.

- 9.6. The aircraft was given "LEMOM ONE BRAVO DEPARTURE RWY18" by Lahore ATCO. The aircraft after take-off when 2NM from Lahore DME was to turn right and proceed to LEMOM on radial 231 degree from the VOR and then on to Rahim Yar Khan. Standard Instrument Departure (SID) chart is attached as Appendix "N".
- 9.7. Boeing 747 is equipped with auto pilot systems, which are designed to relieve pilot from the work load of manual flying so that he can concentrate his attention in attending to properly navigate the aircraft, attend to R/T communications and monitor the instruments. Use of this equipment becomes all the more essential when operating at night time, in bad weather and when there is an emergency situation. Auto pilot may be engaged any time after take-off once flaps have been retracted, but it must be engaged by about 10000 feet in accordance with the SOP's.
- 9.8. The aircraft departed Lahore at 1845 PST (During Night). The take-off was executed by the first officer. When the landing gear lever was selected to up position, the gear door unsafe warning light came on. The flight engineer performed the checks which confirmed that its was an indication problem, the gears were up and locked. Immediately after wards the No.4 generator tripped off. This was reset. The discrepancy was of a minor nature and did not effect the continuation of the flight.
- 9.9. After Take-Off INS No.1 & No.2 are required to be selected to distance and time mode which would give the distance and time to go to the next selected way point (i.e. Rahim Yar Khan) continuously. The aircraft was following a route about 90 degree away from the planned route, the distance and time on the INS would be showing an increase continuously.
- 9.10. The SOP (Boeing 747) clearly states that regardless of the type of departure procedures being conducted, and even under normal weather conditions the pilots must make full use of all avionics/automatic equipment to reduce work load. This is essential to good airmanship.

- 9.11. When a flight plan is filed by the operator with FIC all the details are passed to the concerned PAF Air Defence Sector. After the aircraft is airborne the take-off time is immediately communicated by the FIC to the concerned sector.
- 9.12. At time 1348 (i.e. 3 minutes after take-off) the Duty ATCO Lahore asked PK-727 about the level passing and rate of climb. The pilot reported passing flight level 50 to 350, 6 DME established on radial 321.
- 9.13. Five minutes after take-off of PK-727 from Lahore, SOC made the first query from Lahore FIC regarding any traffic from Lahore to Islamabad. They repeatedly inquired about the unidentified aircraft, on all the occasions Lahore FIC reported no known traffic on this route.
- 9.14. Lahore - Islamabad sector is very busy route on which all types of aircraft ranging from small Cessna to Jumbo Jet operate. The initial out-bound radial from Lahore to INDEK is 321 degrees. PK-727 operated on this route due to wrong selection of radial. He should have been on radial 231. This was an error of 90 degrees. Fortunately no other aircraft was operating on this route at that time, otherwise it could have resulted in a major air disaster.
- 9.15. After incorrectly reporting position MOLTA the pilot selected RK VOR, which he did not receive as he was out of range. The INS was then selected, which indicated a cross track error and a distance of more the 300 NM from Rahim Yar Khan. At this position the Captain realized that he was unsure of his ground position. He started ascertaining his position with the help of navigation aids and corrected his course towards SHANO. After establishing on the course he requested Multan FISS for direct routing from its present position to PANJGUR, to save time. Multan granted permission after obtaining clearance from Karachi FIC.

9.16 The aircraft departed Lahore with a total cruise fuel endurance of 5 hours and 52 minutes. The planned flying time was 4 hours and 15 minutes with Jeddah as an alternate airport. By following the wrong route additional 23 minutes were flown and 4000 Kgs. of extra fuel consumed. The alternate airport was also changed to Dhahran.

10. **OBSERVATION**

10.1. During question/answer sessions with the cockpit crew the investigation team has come to the conclusion that most of the Captains do not conduct 'Departure Briefings' which is mandatory in accordance with the SOPs. The general practice is to say ' Briefing Standard ' without going into details. Flight Engineer is generally ignored. To most of the questions addressed to the Pilots and Flight Engineer by the Investigators, they did not have the ready answers and invariably requested that they may be allowed to refer to the FOM/SOP. It was evident that the Cockpit Crew lacked the essential knowledge of the FOM and SOP.

11. **FINDINGS**

11.1. The crew members were properly licensed and held valid ratings.

11.2. The aircraft B-747 AP-AYW was certified, equipped and maintained in accordance with CAA requirements.

11.3. 'Departure Briefing' was not conducted according to the laid down Standard Operating Procedures.

11.4. Before starting the aircraft Flight Engineer inserted "Zero Position" on the INS system. On Captain's instructions way point LEMOM, MOLTA and some other, although, giving in the flight plan were not fed into the INS. The SOP's were violated.

11.5. The First Officer read back the ATC clearance correctly. He called out on aircraft inter-com and selected radial 321 degrees on both the VOR course selectors instead of the correct radial of 231 degrees.

11.6. The Captain did not select the radial on his VOR course selector nor verified the selection done by the First Officer. This is contrary to the laid down procedures.

11.7. The First Officer executed take-off from RWY 18 at 1345UTC, (night time) turned right and established on the incorrect radial of 321 degrees i.e. 90 degrees away from the planned route.

- 11.8. After take-off on selection of landing gears to up position, the gear doors showed unsafe. Checks showed it was indication problem. Subsequently No. 4 generator also tripped which was reset. The Captain showed poor airmanship by not selecting auto pilot to relieve his work load.
- 11.9 Three minutes after take-off in response to a call by Lahore ATC the First Officer reported that he is out of flight level 50 for 350 and established on radial 321 degrees. Duty ATCO Lahore ignored the wrong radial reported by the aircraft. The Captain also did not register the incorrect radial call.
- 11.10. The aircraft reported position LEMOM on basis of DME reading only without ascertaining, the correctness of the radial or checking correct position from the INS.
- 11.11. After 19 minutes of flight the crew reported position MOLTA on basis of DME distance only, whereas they were not at MOLTA. During this time the pilots did not cross check their position. Although the INS No. 1 and 2 were continuously indicating increasing distance and time from Rahim Yar Khan. INS was not monitored by any crew member. This was yet another gross violation of airmanship and correct cockpit procedures.
- 11.12. Rahim Yar Khan (RK) VOR frequency was selected after crossing the incorrectly reported position MOLTA. The VOR was not being received as the aircraft was out of range. The pilots then selected INS, which indicated to turn left and showed a distance of more than 300 NMS off the track. The Captain did not know his ground position and was lost.
- 11.13. The aircraft flew on the wrong radial 321 degrees for about 27 minutes, it passed 20 NM West of Islamabad and went ahead 20 NM East of Risalpur. No ground controlling agency informed the aircraft during this period that it was following an incorrect route. It remained an unidentified aircraft with them.
- 11.14. Aircraft violated Minhas (Kamra) and Risalpur local flying areas, where it could have had a mid air collision in the declared Restricted Airspace, with military aircraft.
- 11.15. The pilot selected SHANO on the INS and turned left towards SHANO. He continued on this route till time 1443 UTC when it was cleared by Multan FISS and Karachi FIC direct to Panjgur on Captains request.
- 11.16. When the aircraft corrected its track from abeam Risalpur towards SHANO. The Captain passed incorrect position reports, although he had all the equipment to give his correct position. This was an uncalled for action by the Captain to cover up his mistakes. This

could have led to further hazardous situation for other aircraft flying in the area.

11.17. In accordance with SOP's the Flight Engineer is to monitor cross check that correct departure procedure is set on the Flight Control Panel. He is not trained, nor provided with relevant charts to interpret the correctness of the clearance and subsequent selection. This reflects serious inadequacies in the Airline Procedures and training of the cockpit crew (Cockpit Resource Management).

11.18. Immediately after departure of PK-727 the airborne time was passed to SOC by Lahore FIC.

11.19. After 5 minutes of departure of PK-727 SOC frequently kept on inquiring about an unidentified aircraft on route from Lahore to Islamabad from Lahore FIC. When the aircraft was approaching close to Islamabad, fighter aircraft were scrambled by PAF which visually identified the PIA Jumbo and returned to Base without taking any action.

11.20. SOC at no stage inquired about the absence of scheduled flight PK-727 which was supposed to be on route from Lahore to Rahim Yar Khan, and its airborne time had also been passed to it. Better Inter-Sector coordination by SOC would have established link between the unidentified aircraft and missing flight PK-727.

11.21. After one hour and 19 minutes of departure of the aircraft SOC (South) through FIC Karachi gave radar identification turns and change of squawk. The aircraft was identified as PK-727.

11.22. A total of 23 minutes of additional flying consumed extra 4000 Kgs. of fuel. Dharam was selected as alternate airport instead of Jeddah to cater for the reduced fuel endurance.

12. CAUSE

12.1. From the findings and available evidence, the board is of the opinion that the route violation occurred due to the negligence and carelessness on part of the Captain and First Officer by not following the laid down procedures as given in the PIA Operations Manual and Standard Operating Procedures of B-747 aircraft.

13. RECOMMENDATIONS

13.1. Action under Civil Aviation Rules, 1978 may be taken against Captain Mumtaz A. Piracha for violating the following:-

13.1.1. For violation of Flight Operation Manual procedures.

13.1.2. For violation of Boeing 747 Standard Operating Procedures.

13.1.3. Violation of prescribed ATS Routes.

13.1.4. Violation of PAF prohibited/restricted areas.

13.2. Action under the Civil Aviation Rules may be taken against First Officer Ruvi Zaman for not abiding by the laid down procedures and assisting the Captain in safe conduct of flight.

13.3. Cognizance may also be taken by the PIAC management of the lack of involvement by the Flight Engineer of this flight.

13.4. Departmental action may be taken against duty ATCO Lahore Mr. Shahid Wasim for his carelessness.

13.5. Air Defence Command PAF, maybe asked to improve inter-sector coordination to exercise effective monitoring of air traffic in Pakistan Air Space.

13.6. PIAC maybe asked to conducted classes on Flight Operations Manual and Standard Operating Procedures during refresher courses for the pilots and Flight Engineers.

13.7. PIAC maybe asked to consider giving familiarization training in departure/arrival/route charts to Flight Engineers so as to make them more effective member of the cockpit.

13.8. In light of the investigation PIA may be asked to ensure that all the crew strictly adhere to the Flight Operation Manual and Standard Operating Procedures of their respective equipment to the book. The senior/supervisory staff maybe asked to conduct surprise checks to ensure compliance.