



CIVIL AVIATION AUTHORITY

**AIRCRAFT INCIDENT INVESTIGATION M/S PIAC
BOEING - 747 REG.NO.AP-BCO WHICH OCCURRED
ON 17TH MAY, 1996**

AT

**QUAID-E-AZAM INTERNATIONAL AIRPORT
KARACHI.**



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INVESTIGATION REPORT

INCIDENT TO M/S PIAC BOEING - 747 AIRCRAFT
REG NO AP-BCO AT QIAP KARACHI
ON 17TH MAY, 1996

Authority:- Director General Civil Aviation Authority Memorandum
No. HQ CAA/1901/206/SIB dated 21st May, 1996.

COMPOSITION OF INVESTIGATION TEAM

- (a) Air Cdre (Retd) Rashid A. Bhatti : Investigator Incharge
Pilot Investigator, SIB CAA
- (b) Wg. Cdr (Retd) Sajjad Ahmed : Investigator
Technical Investigator SIB

1. AIRCRAFT INFORMATION

- 1.1. Registration Marks : AP-BCO
- 1.2. Aircraft type and maker's : SNo.20927 (747-217B)
Sl. No.
- 1.3. Engine types, airframe : JT9D.#1 66262, #2 685962,
positions and maker's S No. #3 685963 & #4 685973.
- 1.4. Certificate of Reg No and : 589 Valid.
validity.
- 1.5. Certificate of Airworthiness : 542, 14-01-1997
No and date of expiry, and
flight manual No.
- 1.6. Certificate of Safety date : Valid
and time (GMT) of issue and
period of validity.
- 1.7. Date of construction of : 05-10-1974
airframe.

- 1.8 Name and address of Owner : M/S PIAC KARACHI AIRPORT
- 1.9 Gross Weights. Maximum : MTOGW 35153 KGS.
permitted by C of A for this
flight, at the time of incident
- 1.10 Loading. Centre of gravity : CG 31.0% AS PER WEIGHT
limits in C of A and centre of SCHEDULED FOR THE
gravity position at the time PARTICULAR FLT.
of incident and commence-
ment of flight.
- 1.11 Airframe history. (Give flying : TAHF : 78887-03 LDGS: 19123
times since manufacture, CHECK-C C/OUT TAFH: 77823
last overhaul and last LDGS 818858 DATED 01-02-96.
periodic check. (MOD LOG ENTRY ATTACHED)
- 1.12 Engine history. (Give flying : 1- E/S.NO.662626, 57483-49
time since manufacture, last 2- E/S.NO.685962, 40282-53
overhaul and last periodic 3- E/S.NO.685973, 42028-15
check. 4- E/S.NO.685963, 58840-37
- 1.13 Accessory history. (Operate- : ENGINE ACCY LIST ARE
ing life and operating time ATTACHED.
since manufacture and
overhaul.
- 1.14 Defects. (List & remarks : DEFECT REPORT COMPUTER
upon any technical defects PRINT AT (REF. APP 'C')
in airframe engines or
accessories, discovered
during investigation).

2. CREW INFORMATION

2.1 **Pilot-in-Command**

- 2.1.1. Name : AGA AHMAD TEHERANY
- 2.1.2. Position in the cockpit : CAPTAIN
- 2.1.3. Date of Birth : 12.06.1943
- 2.1.4. Type of Lic and No : ATPL NO. 316

2.1.5. Medical dt with status : 18-12-95 FIT FOR ATPL
RENEWAL BY BOARD. SUBJECT
TO USE OF CORRECTIVE
GLASSES.

2.1.6. Rating

2.1.6.1. Type(s) held : F-27, B-707/720B, DC-10, A-300
AND B-747

2.1.6.2. Type current : B-747

2.1.6.3. Flt. Instructor :

2.1.7. Flying Experience

2.1.7.1. Grand total : 15,424.00 HOURS

2.1.7.2. Total -in - : N/A (2466 APPROXIMATELY)
Command

2.1.8. Where trained :

2.2. Co-Pilot

2.2.1. Name : Aamir Aftab

2.2.2. Position in the cockpit : CO-PILOT

2.2.3. Date of Birth : 07.04.1960

2.2.4. Type of Lic and No : ALTP NO. 741

2.2.5. Medical dt with status : 15.02.1996 FIT FOR RENEWAL
OF ALTP

2.2.6. Rating

2.2.6.1. Type(s) held : C-150, F-27, B-707/720B, B-747,

2.2.6.2. Type current : BOEING 747

2.2.7. Flying Experience

2.2.7.1. Grand total : 8578.00 HRS.

2.2.7.2. Total - in - : 2326.16 HRS. 768.00 HRS.
Command

2.2.8. Where trained : PIAC

2.3. **FLIGHT ENGINEER**

2.3.1. Name : MUHAMMAD NAWAZ

2.3.2. Position in the cockpit : FLIGHT ENGINEER

2.3.3. Date of Birth : 05-01-1948

2.3.4. Type of Lic and No : FLIGHT ENGINEER'S LIC NO.161

2.3.5. Medical dt with status : FIT FOR FLIGHT ENGINEER'S
LICENCE RENEWAL

2.3.6. **Rating**

2.2.6.1. Type(s) held : AIRBUS A-300 TYPE OF
AIRCRAFT

2.2.6.2. Type current : B-747

2.3.7. **Flying Experience**

2.2.7.1. Grand total : 9312:00 HOURS

2.2.7.2. Total - in - : 3444:00 HOURS

Command/Flt. Engr on the
type accident/incident
occurred

2.3.8. Where trained : PIAC

3. **SUMMARY**

3.1. On 17th May, 1996 M/S PIAC Boeing-747 aircraft
Reg No. AP-BCO while operating PK-1574 had an
incident at Karachi in which its all sixteen tyres were
burst during landing . The aircraft had 404 souls on

board and its anti-skid system was inoperative which is covered under MEL. Prior to Flight PK-1574 from Jeddah to Karachi the aircraft had operated PK-1573 from Lahore to Jeddah with anti-skid system inoperative. The captain reported that after touch down at Karachi the thrust reversers of all four engines did not come 'ON' and under the circumstances emergency braking technique was used to stop the aircraft. Due to use of excessive brakes the brake assemblies were overheated and all sixteen tyres were burst. The aircraft stopped about 1000 ft short of runway end and no injury to any person was caused due to the incident.

4. **INJURY TO PERSONS**

4.1. There was no injury to any passenger or the crew members.

5. **DAMAGE TO AIRCRAFT**

5.1. All sixteen tyres were burst and all tyre rims were damaged.

6. **OTHER DAMAGES**

6.1. None

7. **METEOROLOGICAL CONDITIONS**

7.1. The weather was fair and visibility was good.

8. **NAVIGATIONAL & LANDING AIDS**

8.1. Not relevant.

9. **COMMUNICATIONS**

9.1. Not relevant.

10. **AERODROME AND GROUND FACILITIES**

10.1. Not relevant.

11. **FLIGHT RECORDERS**

11.1. Copy of the DFDR is attached as Appendix 'E' to this report.

12. **WRECKAGE & IMPACT INFORMATION**

12.1. Not relevant.

13. **FIRE**

13.1. No fire was caused in the incident.

14. **SURVIVAL ASPECTS**

14.1 Not a factor in the incident

15. **TEST & RESEARCH**

15.1 Nil

16. **OBSERVATIONS**

16.1 No discrepancy in the thrust reversers of any engine of the aircraft had been reported prior to the incident.

16.2 Prior to the subject flight the aircraft had operated PK-1314 from Lahore to Jeddah with Anti-Skid system inoperative which is covered in the B-747 MEL.

17. **WITNESSES**

17.1 Statement of witnesses are given in appendix 'G1 ' to 'G8 ' to this Report.

18. **INVESTIGATION**

18.1 On 17th May, 1996 M/s PIAC Boeing-747 aircraft Reg No. AP-BCO while operating PK/1574 from Jeddah to Karachi had an incident in which its all sixteen tyres were burst during landing at Karachi. Prior to operating PK-1574 same aircraft had operated PK-1573 on 16th May, 1996 from Lahore to Jeddah with anti-skid system inoperative. The Anti skid system was deactivated at Lahore when it was reported in the technical log that anti-skid system hydraulic light remains 'ON' and that the parking brake circuit breaker on P-6 panel remains 'OUT' the details of which are given in Appendix 'C ' to this report. In view of both the discrepancies the engineers at Lahore as per the procedure stipulated in B-747 MEL 32-03 item 7 isolated the Anti-Skid system by pulling out the

system circuit breaker, selecting the Anti-Skid Switch to 'OFF' position and positioning Parking Brake Module to No.1 (close) position. A copy of the subject MEL is attached as Appendix 'F' to this report. While operating flight PK/1573 the aircraft did not carry any passenger or cargo and a safe landing was carried out at Jeddah.

- 18.2 After operating PK/1573 same aircraft was scheduled to operate PK/1574 from Jeddah to Karachi. The ground /air crew at Jeddah cleared/accepted the aircraft with anti-skid system inoperative as the aircraft operations with anti-skid 'OFF' is permitted under B-747 MEL 32-03 item 7 provided operations are conducted in compliance with FCOM anti-skid off procedures. The aircraft had 404 souls on board, take-off, cruise and descent was normal. The weather at Karachi was reported normal with surface winds at 240/15 gusting to 20 knots. The captain stated that he was on the controls and prior to landing he briefed his crew about the extra landing distance of about 15% that would be required with anti-skid system inoperative. The aircraft followed the glide slope and localizer beam within normal limits and a normal approach was made. The captain stated that during flare out an up draft of wind was felt which was countered by lowering the nose and holding the attitude. The aircraft touched down some where between 2000-3000 ft down the runway. After touch down the Captain selected the thrust reverser which as per his statement didn't respond and at that stage he brought the nose of the aircraft down and applied manual braking smoothly. However, as the deceleration was slow he applied further pressure on the brake pedals and rapid deceleration at about 100 knots occurred till the aircraft stopped. At this time the captain was informed by the ATC that heavy smoke was observed around the main wheels. Foam was sprayed by fire vehicles on the over heated brake

assemblies and no subsequent damage was caused to the aircraft.

18.3 During post flight inspection all sixteen tyres of the aircraft were found burst and following evidence was observed:-

- (a) Anti-skid Decal was installed on the anti-skid switch and the switch was in 'OFF' position.
- (b) Parking brake module was in No.1 (close) position.
- (c) All four thrust, reversers were in 'stowed' position.
- (d) Leading edge flaps were in out position.
- (e) All sixteen main tyres were burst.
- (f) All main tyres rims were damaged and had worn off about 2 to 3 inches from one side which remained in contact with ground due to jamming of the wheels.
- (g) All equalizing rods of the main landing gears had grinding marks.

18.4. The aircraft had stopped about 1000 ft short of the runway end. Few tyres pieces were found about 4500 ft and maximum tyres pieces were found about 5000 ft down the runway respectively. A detail sketch of the runway prepared soon after the incident is attached as Appendix 'D' to this report.

18.5 After replacing the main wheels the aircraft was brought to the ramp where operation of all four thrust reversers was checked several times during ground run and their operation was found satisfactory. The deploying time of all four thrust was also found within limits (2 to 4 seconds).

18.6 **Landing Phase Briefing.** The Captain stated that prior to landing he had briefed the cockpit crew about the extra landing distance of about 15% that would be required with anti-skid system inoperative. The fact that such a briefing was carried out was validated from the statement of first officer and the flight engineer. However, the Board found that under the circumstances an extra landing distance of about 80% was required which the Captain was not aware of. As such, a gross error in the planning phase was involved and this wrong assessment was not corrected either by the first officer or the flight engineer. Both flight engineer and the co-pilot when asked about the subject error did not validate that captain in his briefing prior to landing had quoted a figure of 15% for extra landing distance which was required under the circumstances. Additionally, while replying to a question the Flight engineer stated that extra runway length required was about 80% more with anti-skid system inoperative.

18.7. **Aircraft Approach.** Both Captain and the First officer stated that the aircraft followed the glide slope and localizer beam within normal limits and a normal approach was made. This was validated by the DFDR data the details of which are given Appendix 'E' to this report.

18.8 **Late Touch Down.** The Captain initially stated that aircraft touched down some where between 2000 to 3000 ft down the runway; whereas, the first officer stated that touch down was made about 2600 to 3000 ft down the runway. The air traffic controllers informed the Board that the aircraft approach was high and it touched down after taxi way Foxtrot and close to taxi way delta. It was found that taxi way Foxtrot and Delta are located 3000 and 7500 ft down the runway 25R. The Board from the analysis of the DFDR data estimated, after giving latitude for various factors that the aircraft had touched down about 4000 ft down the runway. The DFDR data was also referred to the Boeing Company who roughly estimated the touch down to be about 3500 ft down the runway. From the foregoing evidence it was concluded that the aircraft had touched down beyond 3500 ft down the runway 25R.

18.9 **Thrust Reversers Operation.** It was stated by the Captain that soon after touch down the thrust reversers were selected and did not deploy. The flight engineer also validated that after touch down the captain selected the thrust reverser lever to Interlock position and the Reverse Unlock and Reverse in Transit light didn't illuminate. However, soon after the incident the Board carried out operational check of all the thrust reversers during ground run several times and their operation was found satisfactory. Additionally, all the thrust reversers deploying time was found within limit (2 to 4 sec). While reviewing the DFDR data it was found that all four thrust reversers were not deployed and that the leading edge flaps were in the extended position. It may be pointed out that the leading edge flaps are extended when the flaps are lowered and soon after the thrust reversers are extended the Leading edge flaps are retracted to Fully-In position. Also, during post flight inspection the

Board found that the leading edge flaps were in the extended position. The aircraft historical record also indicate that no rectification was carried out on any of the thrust reversers prior to the incident. Additionally, it was found that till 1st July, 1996 the aircraft had carried out 13 flights and operation of all thrust reversers was found satisfactory. As such, the Board inferred from the available evidence that the Thrust Reverser system of all engines was serviceable and the Captain failed to select the Thrust Lever properly due to which the thrust reversers didn't come 'ON'.

- 18.10 **Tyres Conditions.** All sixteen tyres were burst during the incident which is a unique case in the history of B-747 aircraft operations. Additionally, the aircraft tyres are changed subject to condition of an individual tyre. Therefore, all sixteen tyres burst at one time can not be attributed to the tyres condition(s).

18.11 **CONCLUSION**

- 18.11.1 Prior to Jeddah Karachi Flight PK-1574 on 17th May, 1996 Boeing-747 aircraft Reg No.AP-BCO had operated flight PK-1573 from Lahore to Jeddah on 16th May, 1996 with its Anti-Skid system inoperative. The aircraft operation with Brake Anti-Skid system inoperative is allowed by the manufacturer under Boeing-747 MEL 32-03 item 7. As such, the aircraft was cleared for the subsequent flight from Jeddah to Karachi with inoperative Anti-Skid system. The aircraft start up, climb, cruise and led down was normal. However, prior to landing the Captain thought that about 15% extra landing distance was required with anti-skid system inoperative; whereas, in subject case about 80% extra distance was required. As such, the pilot made a gross error in his judgment during the

planning phase prior to landing and touched down after about 3500 ft down the runway instead of touching down at the beginning of the runway.

18.11.2 Due to late touch down the Captain became panicky and failed to select the thrust reversers properly. Consequently, all four thrust reversers did not deploy. Soon after the incident operation of all four thrust reversers was found satisfactory. Additionally, by 1st July, 1996 same aircraft had operated 13 flight in which no discrepancy in any of the thrust reversers was reported.

19. FINDINGS

19.1 On 17th May, 1996 Boeing-747 aircraft Registration No. AP-BCO while operating flight PK-1574 had an incident at Karachi airport in which its all sixteen tyres were burst.

19.2 Prior to flight PK-1574 same aircraft had operated PK-1573 on 16th May, 1996 from Lahore to Jeddah with Anti-Skid system inoperative.

19.3 Prior to operation of PK-1573 the aircraft Anti skid system was deactivated at Lahore when it was reported in the technical log that Anti-Skid system hydraulic light remains 'ON' and that the parking brake circuit breaker on P-6 panel remains 'OUT'. In view of both the discrepancies the engineers at Lahore as per the procedure stipulated in B-747 MEL 32-03 item 7 isolated the Anti-Skid system by pulling out the system circuit breaker, selecting the Anti-Skid Switch to 'OFF' position and positioning Parking Brake Module to No.1 (close) position and cleared the aircraft to operate subject to compliance with FCOM procedure with anti-skid OFF.

- 19.4 During PK-1574 operation the take-off, climb, cruise and descent was normal.
- 19.5 Captain Teherani was on the controls at the time of descent.
- 19.6 Captain Teherani erroneously estimated that with anti-skid system inoperative an extra landing distance of about 15% would be required; whereas, actually it was about 80%.
- 19.7 Prior to landing the Captain did brief the cockpit crew about the circumstances under which the landing was to be carried out; however, he did not categorically tell the crew that with anti-skid system inoperative an extra landing distance of about 15% would be required.
- 19.8 The weather was fair with gusting winds 240/15 knots runway 25R and there were no wet runway conditions.
- 19.9 The aircraft followed the glide slope and made a visual approach for landing. No deviation was observed in the DFDR .
- 19.10 The aircraft touched down after about 3500 ft down the runway 25R.
- 19.11 Landing too far down the runway the pilot became panicky and failed to select the thrust reversers properly which resulted in non deployment of all the four thrust reversers. Under the circumstances the pilot applied excessive brakes causing over heating of the brake assemblies and tyres burst.
- 19.12 The aircraft stopped about 1000 ft short of the runway end.
- 19.13 All the sixteen main tyres were burst and portion of all tyres rim surface were rubbed off about 2 to 3 inches.

- 19.14 Soon after landing excessive smoke was observed around all the main tyres due to overheating which was timely controlled by the fire vehicles.
- 19.15 All passengers evacuated the aircraft using the normal exit.
- 19.16 No maintenance malfunction in the aircraft brake system except anti skid inoperative was observed.
- 19.17 Despite the fact the pilot reported that all engine thrust reversers did not operate could not be validated and all thrust reversers operation was found satisfactory.
- 19.18 After the incident the aircraft had operated 13 flights by 1st July, 1996 in which no discrepancy in the thrust reverses was reported.

20. Causes

- 20.1 Wrong estimation by the pilot prior to landing that an extra landing distance of about 15% instead of 80% was required with anti-skid system inoperative.
- 20.2 Failure of the captain to exchange notes with other crew members in concrete terms regarding the penalties to be applied during landing with anti-skid system inoperative.
- 20.3 With Anti-Skid system inoperative instead of landing at the beginning of the runway the Captain touched down after about 3500 ft down the runway and became panicky and failed to select the thrust reversers properly which eventually did not deploy.

21. Recommendations

21.1 Disciplinary action should be taken against Captain Aga Ahmad Teherani for:-

21.1.1 Making an incorrect estimation of the extra landing distance that was required with anti skid system inoperative.

21.1.2 Landing too far down the runway with anti-skid system inoperative instead of utilizing maximum runway length.

21.1.3 Not selecting the thrust reversers properly which did not deploy.

21.2 Captains should consult other members of the crew while planning for an abnormal situation and all actions involved in the scenario should be pre-planned in concrete terms.

21.3 Director Flight Operations, PIAC to brief all the pilots that they must make positive effort to fly the correct approach with a view to touch down at the beginning of the runway, particularly when landing with inoperative Anti-Skid System etc.

21.4 Director Flight Operation PIAC should ensure that all Captain's are aware of the Operational and Technical consequences while accepting the aircraft with inoperative equipment/system covered by the MEL. However, keeping in view the planned mission requirements/schedules, if considered necessary in the interest of Flight Safety, the Captain must exercise his authority and insist on the rectification of a defect even though it is covered under MEL.

APP. 'B1'



PHOTO TAKEN AFTER LANDING LEFT BODY GEAR & WING
GEARS TYRES BURST

APP. 'B2'



BODY GEARS & WING GEAR ALL TYRES BURST



ANOTHER VIEW OF LEFT WING GEAR TYRES BURST

3



CLOSE UP VIEW OF LEFT WING & BODY GEARS TYRES

APP. 'B5'



LT. WING GEAR WING GEAR TYRES BURST

APP. 'B6'



LEFT BODY GEARS TYRES BURST

APP. 'B7'



RT. BODY GEAR ALL TYRES BURST

APP. 'B8'



ALL TYRES BURST WING GEAR

APP. 'B9'



TYPICAL TYRE & RIM AFTER THE INCIDENT.
NOTE: THE DRAG MARK ON THE RIM OUTER SURFACE

6

APP. 'B10'



TYPICAL TYRE BURST SURFACE



TYPICAL TYRE BURST SURFACE

7



TYPICAL TYRE BURST SURFACE