

FINAL INVESTIGATION REPORT



SERIOUS INCIDENT LANDING ON WRONG RUNWAY

**PAKISTAN INTERNATIONAL AIRLINES FLIGHT PK-150
AIRBUS 320-214 AIRCRAFT REG NO. AP-BON AT AIIAP,
LAHORE ON 17-01-2025**

SCOPE

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TABLE OF CONTENTS

SECTION 1 - FACTUAL INFORMATION	10
1.1. History of the Flight	11
1.2. Injuries to Person(s)	16
1.3. Damage to Aircraft	16
1.4. Other Damage	16
1.5. Personnel Information	17
1.6. Aircraft Information	18
1.7. Meteorological Information	18
1.8. Aids to Navigation	20
1.9. Communications	20
1.10. Aerodrome Information	20
1.11. Flight Recorders	21
1.12. Wreckage and Impact Information	21
1.13. Medical and Pathological Information	21
1.14. Fire	21
1.15. Survival Aspects	21
1.16. Test and Research	21
1.17. Organizational and Management Information	22
1.18. Additional Information	22
1.19. Use of Effective Investigation Techniques	23
SECTION 2 – ANALYSIS	24
2.1. General	25
2.2. Flight Operations	25
2.3. Organizational Factors	33
SECTION 3 – CONCLUSIONS	35
3.1. Findings	36
3.2. Cause / Contributory Factors	37
SECTION 4 – SAFETY RECOMMENDATIONS	38
4.1. Safety Recommendations	39

LIST OF FIGURES

Sr.	Title	Page
Figure 1	PK-150 Flight Route	11
Figure 2	ILS Z Approach for R/W 36R AllAP, Lahore.....	14
Figure 3	ILS Z Approach for R/W 36L AllAP. Lahore	15
Figure 4	Diversion route selected display on ND	26
Figure 5	Correct Settings to select OPLA ILS-36R-Z (pg1 of FMS).....	26
Figure 6	Correct Settings to select OPLA ILS-36R-Z (pg2 of FMS).....	27
Figure 7	Wrong selection of frequency on FMS.....	27
Figure 8	Correct settings for OPLA ILS36R-Z	28
Figure 9	FMD Display	28
Figure 10	CAT-III AFLS OPLA.....	28
Figure 11	Aerial View of both R/W Approach and R/W Lights.....	29
Figure 12	PK-150 established on Glide Slope at 10NM	29
Figure 13	PK-150 observed Left of Track.....	30
Figure 14	AFLS and Radar Display screen at Control Tower	30
Figure 15	Simulator pics on Actual weather Conditions (Visibility 150m RVR 700m)31	
Figure 16	PFD	31

LIST OF TABLES

Table No.	Title	Page
Table 1	Details of Injuries to Persons On-Board.....	16
Table 2	Captain's Brief Description	17
Table 3	FO's Brief Description.....	17
Table 4	Approach Controller's Brief Description.....	17
Table 5	Tower Controller's Brief Description	17
Table 6	Area Surveillance Controller's Brief Description	17
Table 7	Aircraft Information	18
Table 8	METAR details MIAP, Multan	18
Table 9	METAR description MIAP, Multan at time 0200Z	18
Table 10	METAR description MIAP, Multan at time 0300Z	19
Table 11	METAR details for AIIAP, Lahore	19
Table 12	METAR description AIIAP, Lahore at time 0225Z.....	19
Table 13	Radio Navigation & Landing Aids AIIAP, Lahore	20
Table 14	Communication Facilities, AIIAP, Lahore.....	20
Table 15	Aerodrome Information – R/W Physical Characteristics AIIAP, Lahore.....	21

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ABBREVIATIONS

ACC	Area Control Centre
AIAP	Allama Iqbal International Airport
ATCOs	Air Traffic Control Officers
ATS	Air Traffic Service
BASIP	Bureau of Aircraft Safety Investigation Pakistan
BEA	Bureau of Enquiry and Analysis
CRM	Crew Resource Management
CTR	Control Zone
CVR	Cockpit Voice Recorder
DH	Decision Height
DME	Distance Measuring Equipment
EVS	Enhanced Visual Guidance
FDR	Flight Data Recorder
FIR	Lahore Flight Information Range
FL	Flight Level
FMA	Flight Mode Annunciator
FMC	Flight Management Computer
FMS	Flight Management System
ft	Feet
GPS	Global Positioning System
h	Hour (s)
ILS	Instrument Landing System
IOU	Incident Occurrence and Unserviceability Report
JIAP	Jinnah International Airport, Karachi
KFIA	King Fahd International Airport
kts	Knots
LVP	Low Visibility Procedure
m	Meter (s)
METAR	Meteorological Aerodrome Report
MIAP	Multan International Airport
ND	Navigational Display
NM	Nautical Miles
OEDF	King Fahd International Airport
OJT	On Job Training
PAA	Pakistan Airport Authority
PCAA	Pakistan Civil Aviation Authority
PF	Pilot Flying
PFD	Primary Flight Display
PIA	Pakistan International Airlines
PM	Pilot Monitoring
R/W	Runway
RVR	Runway Visual Range
SMGCS	Surface Movement Guidance and Control System
TCP	Transfer of Control Point
TMA	Terminal Control Area
UTC	Universal Time Coordinated

INTRODUCTION

This serious incident was reported to Bureau of Aircraft Safety Investigation Pakistan (BASIP) by Pakistan Airports Authority (PAA) vide Incident Occurrence and Unserviceability Report (IOU)¹. This serious incident was notified² to International Civil Aviation Organization (ICAO), Bureau of Enquiry and Analysis (BEA) for Civil Aviation Safety, France in line with Annex-13. The investigation has been conducted by BASIP.

¹ PAA IOU Report dated 17th January, 2025

² Notification to ICAO

SYNOPSIS

On 17 January, 2025, Pakistan International Airlines (PIA) Flight PK-150, an Airbus A320-214 aircraft, registration No. AP-BON mistakenly landed on the wrong runway (R/W) 36L instead of 36R at Allama Iqbal International Airport (AllAP), Lahore.

PK-150 was a scheduled commercial passenger flight which took off from King Fahd International Airport (OEDF), Dammam, Saudi Arabia for Multan International Airport (MIAP), Multan, however, it was diverted to AllAP, Lahore due to adverse weather conditions at MIAP, Multan.

Meanwhile Lahore was also reporting foggy condition with reduced visibility hence Low Visibility Procedures (LVP) were enforced at AllAP, Lahore. The aircraft was cleared for Instrument Landing System (ILS) Approach (CAT-III) R/W 36R. Instead of aligning with the designated R/W 36R, the aircraft mistakenly landed on an unintended R/W 36L due to the wrong feeding of the ILS frequency in Flight Management System (FMS). Fortunately, there were no injuries or damage reported to any person on-board or on ground. All corresponding timings are mentioned in Universal Time Coordinated (UTC).

SECTION 1 - FACTUAL INFORMATION

1.1. History of the Flight

1.1.1. On 17 January, 2025, M/s PIAC Flight PK-150, Airbus 320-214 aircraft, Registration No. AP-BON took off from OEDF, Dammam, Saudi Arabia for MIAP, Multan and entered Pakistan airspace via Air Traffic Services (ATS) route ASVIB – G665 – PG – G214 – SK – J119 – KASBI.

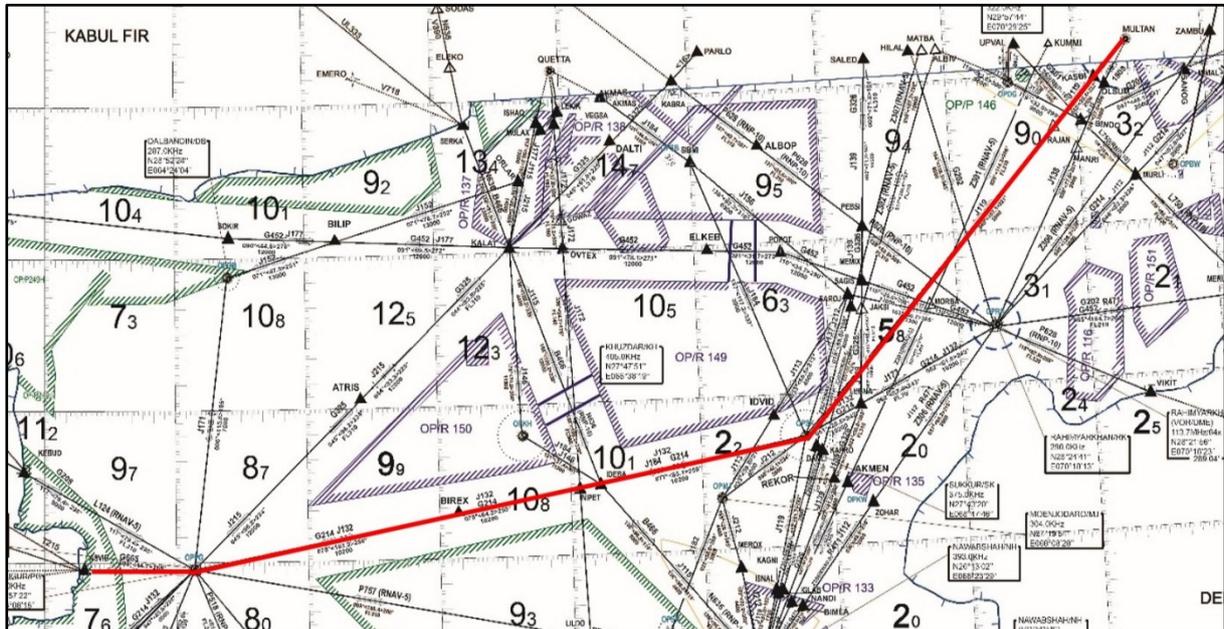


Figure 1 PK-150 Flight Route

1.1.2. Before entering the Pakistan airspace, PK-150 flight remained un-eventful and at approx **005200** PK-150 entered Pak airspace.

1.1.3. **010158**. PK150 came in contact with Karachi FIR.

1.1.4. **010226**. Karachi FIR informed about visibility at Multan is 50m.

1.1.5. **010314**. PF & PM discuss about diversionary airfields.

1.1.6. **010352-010431**. During discussion, PF informed that he would decide after knowing visibilities at Multan, Karachi and Lahore. PF tried to establish contact PIA Karachi communication and after 09 attempts PIA Karachi Communication responded.

1.1.7. **010601**. Karachi communication informed visibilities at Multan 50m, Karachi 4km and Lahore 300m fog, which was acknowledged by PF.

1.1.8. **010730-011130**. PF offered Fajr (morning prayers). Handing / taking over controls to PM was not followed.

1.1.9. **011222**. Karachi communication passed detailed weather update for all 03 stations.

1.1.10. **011340**. PF requested PIA Karachi communication to inquire from PIA Situation about diversionary decision whether to divert to Lahore or Karachi as Karachi is 175 NM from present position.

1.1.11. **011453**. PF inquired about CAT III status from PM to which he acknowledged as qualified.

- 1.1.12. **011652.** PIA Karachi communication informed PK150 to proceed to Multan and in case of bad weather then divert to Karachi.
- 1.1.13. **011705.** PF discussed with PIA Karachi communication as visibility will not improve early so they want to divert them to Karachi then it is better now.
- 1.1.14. **012000.** PF discussed with PM about flight duty time and calculated for themselves as 08 hrs and for cabin crew 09 hrs. Moreover, PF had also feared that if they diverted to Karachi, the cabin crew would not be available.
- 1.1.15. **012201.** PF recontacted PIA Karachi communication to get PIA Situation supervisor on RT.
- 1.1.16. **011247.** PF suggested situation supervisor its better to divert to Lahore than Karachi after reaching Multan and requested his decision for diversionary airfield.
- 1.1.17. **011326.** Situation supervisor agreed with PF suggestion and cleared PK150 to divert to Lahore.
- 1.1.18. **012500-012700.** PM started to fiddle with FMS to make diversion route to which PF stopped him as it too early.
- 1.1.19. **012935-013501.** Necessary diversion coordination was carried with Karachi FIR for direct routing and availability of parking space at Lahore. During coordination PM failed to monitor Karachi FIR number of calls as he might seems to be engrossed in cockpit on FMS for making diversion route
- 1.1.20. **013518.** PM commenced to make diversion route.
- 1.1.21. **013600.** Karachi FIR reconfirmed landing minima and endurance from PF. PF replied with 182 souls, ETA Lahore 023500, endurance 2:05 hrs, ops minima's CAT III, No DH and 75m.
- 1.1.22. **013820.** PF cross check route on FMS and announced complete route with 03 times announcing RW36R and ILS Z approach which was cross checked by PM. During rechecking PF corrected missed approach height to 3000 feet which was wrongly fed by PM as 1700 feet. At this time PM seem to be not attentive as it seemed that he was engrossed in going through some procedures.
- 1.1.23. **013821-015000.** PF briefed LVP to PM. During briefing PF was guiding PM as he was lagging and guiding through pages and paras due to his poor knowledge and orientation on LVP. Meanwhile PF crossed check all aircraft systems for auto land.
- 1.1.24. **015015-015235.** PF conducted approach briefing to PM. PF requested PM to go through QRH to verify procedure, however PM did not respond and here it seemed that PF himself consulted QRH. At this time, PM was more worried to contact Multan tower to informed him about diversion, however, PF told him as ample time is available and concentrate on going through procedures.
- 1.1.25. **015323.** PF allowed PM to contact Multan tower.
- 1.1.26. **015540-015600.** PF rechecked all systems for auto land.
- 1.1.27. **020403.** PK150 contacted Lahore control.

- 1.1.28. **020740-021023.** PF was again guiding PM on FMS about display of either No DH or DH as there was some confusion in PM mind.
- 1.1.29. **022114.** PK-150, while descending out of Flight Level (FL)164 for FL150 and proceeding direct to ELAMA, contacted Lahore Approach on frequency 121.3 MHz.
- 1.1.30. **022121.** Approach Controller cleared the aircraft to descend 3,000 feet (ft), heading 050°, radar vectors for ILS Approach RW 36R.
- 1.1.31. **022148.** Approach Controller informed the pilot about the latest visibility at Lahore which was 300 meters (m) with Runway Visual Range (RVR) 600 m touchdown, 600 m midway and 500 m end of R/W 36R.
- 1.1.32. **022208.** Upon inquiry, pilot reported that the company RVR minima for landing at Lahore (CAT-III operations) is 75 m.
- 1.1.33. **022738.** The Approach Controller issued a caution to the pilot regarding the possibility of false terrain warnings due to Global Positioning System (GPS) spoofing in the vicinity of AllAP, Lahore.
- 1.1.34. **022809.** PK-150 was given left heading 040° and cleared for an ILS Approach to R/W 36R.

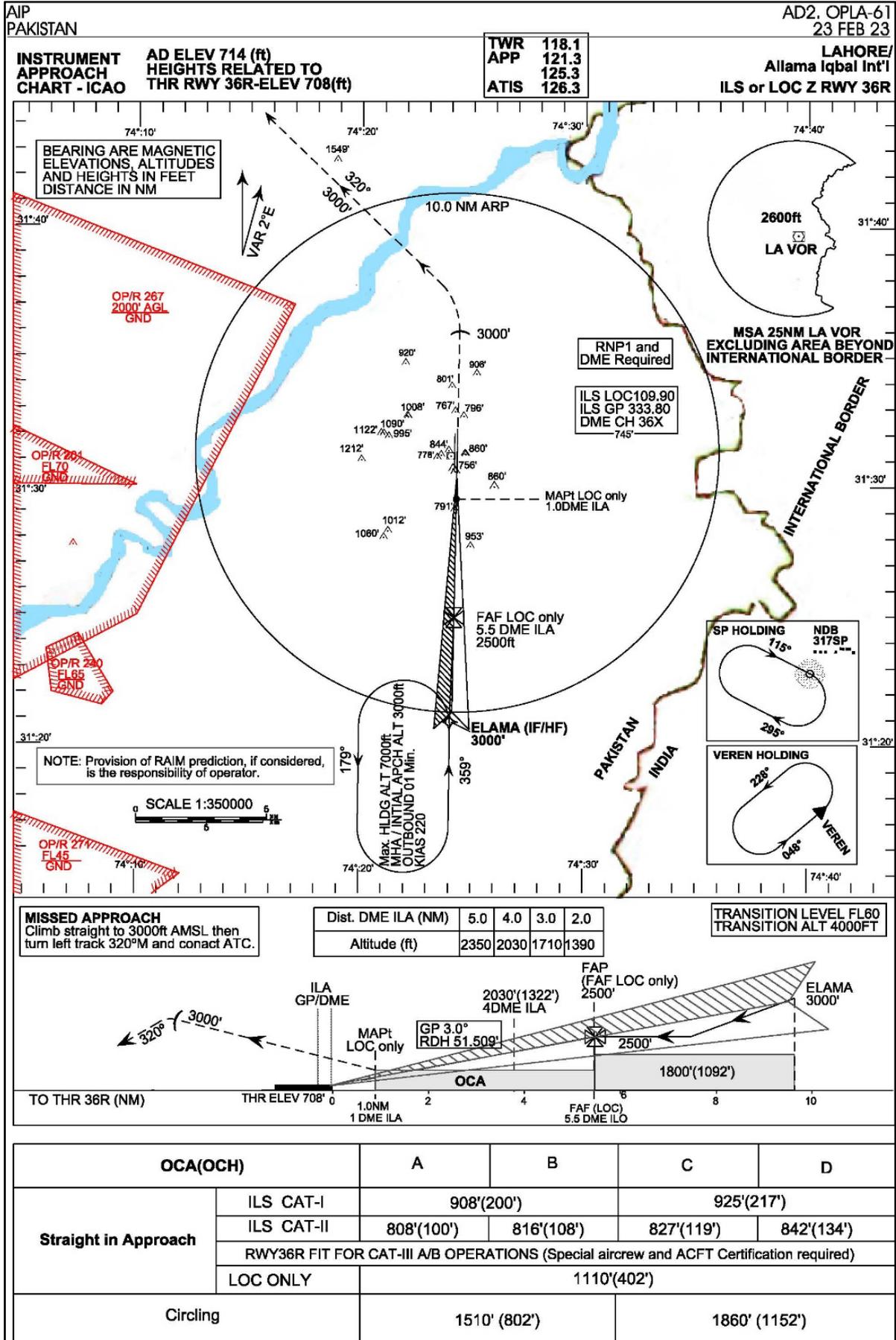


Figure 2 ILS Z Approach for RW 36R AIIAP, Lahore

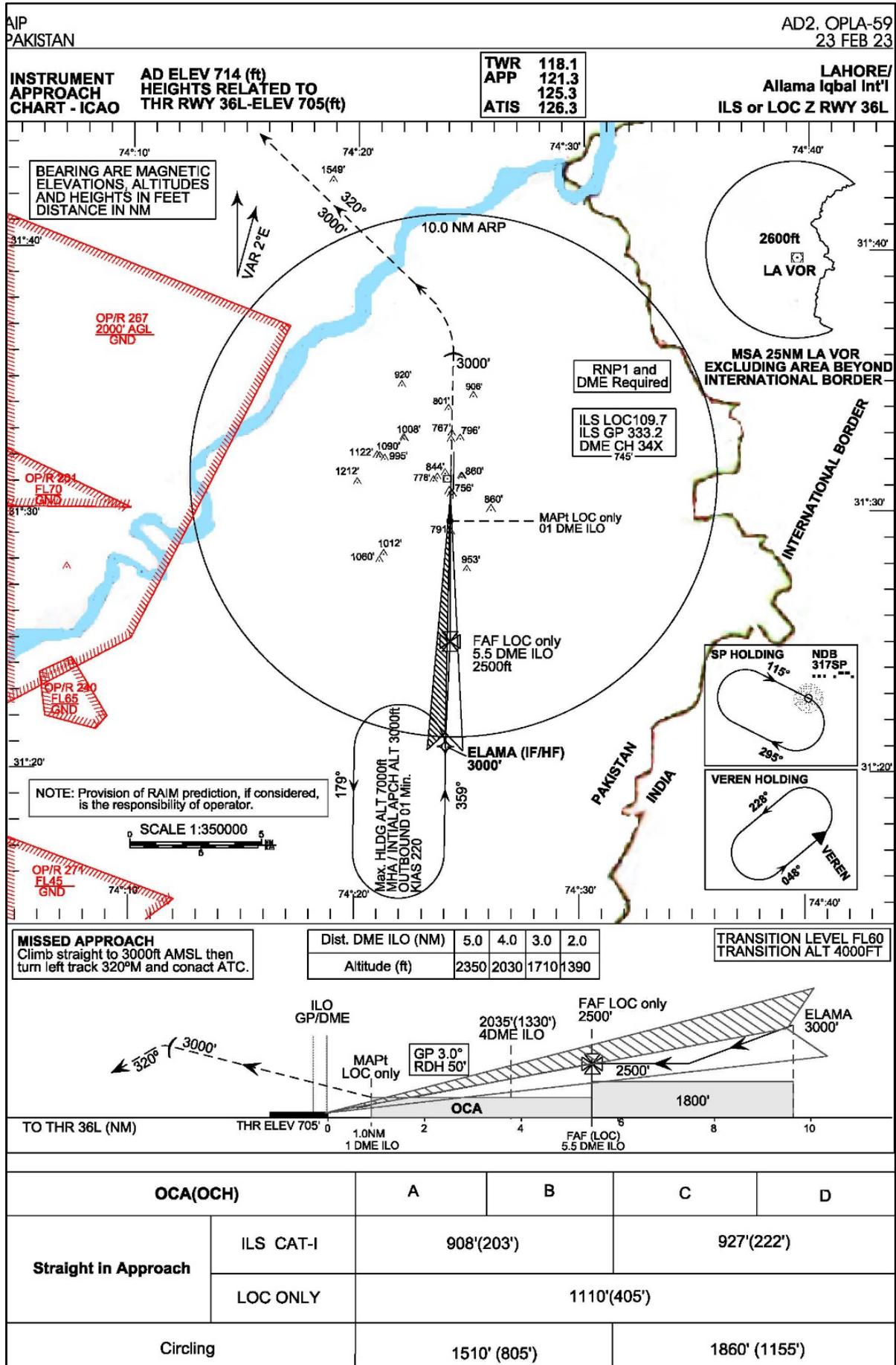


Figure 3 ILS Z Approach for R/W 36L AIIAP. Lahore

- 1.1.35. **023050.** PK-150 reported established on ILS Approach R/W 36R, 10 Nautical Miles (NM) from touchdown R/W 36R.
- 1.1.36. **023056.** The Approach Controller then instructed the aircraft to contact Lahore Tower on frequency 118.1 MHz.
- 1.1.37. **023113.** PK-150 contacted Lahore Tower on frequency 118.1 MHz at 8.6 Distance Measuring Equipment (DME) and reported established on ILS R/W 36R.
- 1.1.38. **023120:** The Tower Controller instructed the aircraft to continue Approach R/W 36R and informed the pilot about updated surface wind (300° 05 kts) and RVR conditions (700 m touchdown, 700 m midway and 700 m end of the R/W 36R).
- 1.1.39. **023213.** Tower Controller issued Landing clearance to PK-150 for R/W 36R.
- 1.1.40. **023355.** The Approach Controller informed Tower Controller that PK-150 had deviated to the left of its intended track and advised the Tower Controller to verify this with the pilot and take appropriate action.
- 1.1.41. **023400.** Tower Controller confirmed from the pilot if he was visual with the airfield as the aircraft was observed to be left of track upon which the pilot responded “**NEGATIVE**”. Meanwhile, the Tower Controller switched on the lights of R/W 36L.
- 1.1.42. **023433.** Pilot reported airfield insight.
- 1.1.43. **023600.** PK-150 inadvertently landed on the incorrect R/W i.e R/W 36L instead of 36R at AllAP, Lahore.

1.2. Injuries to Person(s)

- 1.2.1. No injury was reported to any person on board the aircraft or on ground.

Injuries	Crew	Passengers	Total in the Aircraft	Others
Fatal	Nil	Nil	Nil	Nil
Serious	Nil	Nil	Nil	Nil
Minor	Nil	Nil	Nil	Nil
None	08	174	182	Nil
Total	08	174	182	Nil

Table 1 Details of Injuries to Persons On-Board

1.3. Damage to Aircraft

- 1.3.1. No damage to the aircraft was reported at the time of the occurrence.

1.4. Other Damage

- 1.4.1. No other damages were reported

1.5. Personnel Information

Captain / Pilot Monitoring	
Age / Nationality / Gender	50 Years / Pakistani / Male
License Type / Validity / Rating	ATPL / 31-03-2025
Medical Validity	30-09-2025
Flying Hours in past 24 hours	Day Off
Total Flying Hours	9,494.20 hours (h)
Type rated aircraft	1,190.29 h
Pilot flying / Pilot monitoring at the time of occ	Pilot Flying

Table 2 Captain's Brief Description

First Officer (FO) / Pilot Flying	
Age / Nationality / Gender	46 Years / Pakistani / Male
License Type / Validity / Rating	ATPL / 31-10-2029 /
Medical Validity	31-07-2025
Flying Hours in past 24 hours	Day Off
Total Flying Hours	6,652.20 h
Type rated aircraft	160.10 h
Pilot flying / Pilot monitoring at the time of occ	Pilot Monitoring

Table 3 FO's Brief Description

Approach Controller	
Age / Nationality / Gender	45 Years / Pakistani / Male
Type of License and Validity	ATCL / June, 2027
Class and Validity of Medical	Class V / 18-12-2026

Table 4 Approach Controller's Brief Description

Tower Controller	
Age / Nationality / Gender	32 Years / Pakistani / Male
Type of License and Validity	ATCL / August, 2027
Class and Validity of Medical	Class IV / 03-12-2025

Table 5 Tower Controller's Brief Description

Ground Movement Controller	
Age / Nationality / Gender	31 Years / Pakistani / Male
Type of License and Validity	ATCL / August, 2028
Class and Validity of Medical	Class IV / 05-03-2027

Table 6 Area Surveillance Controller's Brief Description

1.6. Aircraft Information

PK-150	
Aircraft Make & Model	Airbus 320-214
Registration Marking	AP-BON
Manufacturer Serial No.	5746
Year of Manufacturer	2013
Owner / Lesser	Pakistan International Airlines (PIA)
Operator	Pakistan International Airlines (PIA)
Sector	Dammam – Lahore
Maximum Take-off Weight	169,750 kilograms (kgs)
Maximum Landing Weight	142,000 kg
Maximum Fuel Capacity	27,200 Liters (L)
Flight conditions	Normal

Table 7 Aircraft Information

1.7. Meteorological Information

1.7.1. **MIAP, Multan Weather Conditions** – At the time of the incident, the weather conditions at MIAP, Multan were reported to be dense fog, reducing visibility to 50 meters, with obscured vertical visibility. The wind was calm (0 knots), and the temperature and dew point were both 7°C, indicating 100% humidity. Meteorological data for MIAP, Multan³ is as mentioned below: -

Meteorological Aerodrome Report (METAR) MIAP, Multan
OPMT 170200Z 00000KT 0050 FG VV/// 07/07 Q1023 NOSIG=
OPMT 170300Z 00000KT 0050 FG VV/// 07/07 Q1024 NOSIG=

Table 8 METAR details MIAP, Multan

METAR MIAP, Multan	
OPMT	Station ID: Multan International Airport (MIAP), Pakistan
170200Z	Day: 17 Time: 02:00 UTC (Date & Time)
00000KT	Wind Direction: No direction, Speed: 0 kt (Calm & no direction)
0050	50 m (Visibility in meters)
FG	Weather: Fog
VV///	Vertical visibility: Obscured (exact value not reported)
07/07	07°C (Temperature) / 07°C (Dew point)
Q1023	Air pressure is 1023 hPa (Altimeter setting)
NOSIG	No significant weather changes expected

Table 9 METAR description MIAP, Multan at time 0200Z

³ Pakistan Meteorological Department – Weather report around MIAP, Multan

METAR MIAP, Multan	
OPMT	Station ID: Multan International Airport (MIAP), Pakistan
170300Z	Day: 17, Time: 03:00 UTC (Date & Time)
0000KT	Wind Direction: No direction, Speed: 0 kt (Calm & no direction)
0050	50 m (Visibility in meters)
FG	Weather: Fog
VV////	Vertical visibility: Obscured (exact value not reported)
07/07	07°C (Temperature) / 07°C (Dew point)
Q1024	Air pressure is 1024 hPa (Altimeter setting)
NOSIG	No significant weather changes expected

Table 10 METAR description MIAP, Multan at time 0300Z

1.7.2. **Weather conditions at AllAP, Lahore** – Weather conditions at AllAP, Lahore on at 0225 were reported to be dense fog, reducing visibility to 150 m, accompanied by light winds from the west at 4 knots (kts). The RVR measured 550 m for R/W 36 and 450 m for R/W 18. Vertical visibility was obscured due to fog, while both the temperature and dew point were recorded at 6°C, indicating fully saturated air. The atmospheric pressure was 1024 hPa, with fog conditions expected to continue around 0350. Meteorological data for AllAP, Lahore⁴ is as mentioned below: -

Meteorological Aerodrome Report (METAR) AllAP, Lahore
OPLA 170225Z 27004KT 0150 R36/0550N R18/04500 FG VV//// 06/06 Q1024 BECMG 0350 FG RMK

Table 11 METAR details for AllAP, Lahore

METAR AllAP, Lahore	
OPLA	Station ID: Allama Iqbal Int'l Airport (AllAP, Lahore, Pakistan)
170225Z	Day: 17, Time: 02:25 UTC (Date & Time)
27004KT	Wind Direction: 270°, Speed: 04 kt
0150	150 m (Visibility in meters)
R36/0550N	Runway Visual Range R/W 36 Visibility 550 m Trend N No change
R18/04500	Runway Visual Range R/W 18 Visibility: 450 m
FG	Weather: Fog
VV////	Cloud Layer Vertical visibility: Obscured (exact value not reported)
06/06	06°C (Temperature) / 06°C (Dew point)
Q1024	Air pressure is 1024 hPa (Altimeter setting)
BECMG	Conditions expected to change gradually within the next 2 hours
0350	Visibility 350 m
FG	Fog
RMK	Remarks

Table 12 METAR description AllAP, Lahore at time 0225Z

⁴ Pakistan Meteorological Department – Weather report around AllAP, Lahore

1.8. Aids to Navigation

1.8.1. Navigational aids for AllAP, Lahore are provided below. At the time of incident, no abnormality was reported.

TYPE OF AID	ID	Frequency	Hours of operation	Site of transmitting antenna coordinates	Elevation of DME transmitting antenna	Remarks
1	2	3	4	5	6	7
ILS/LOC CAT I 36L	ILO	109.7 MHz	H24	313223.67N 0742410.54E	NIL	NIL
ILS/LOC CAT III 36R	ILA	109.9 MHz	H24	313224.49N 0742417.66E	NIL	Coverage 20 NM
NDB	LA	268.0 kHz	H24	313123.41N 0742348.18E	NIL	NIL
DVOR/DME (2°E/2020)	LA	112.7 MHz CH74X	H24	313109.66N 0742400.05E	227.07M	200NM
MM	-	75.0 MHz	H24	312949.99N 0742414.91E	NIL	RWY 36R
OM	LO	338.0 kHz	H24	312641.15N 0742404.47E	NIL	Locator Outermarker RWY 36R
OM	-	75.0 MHz	H24	312641.50N 0742404.51E	NIL	RWY 36R
GP/TDME 36L	ILO	333.2 MHz CH34X	H24	313042.70N 0742403.86E	235.31M	3° RDH/TCH 50FT
GP/TDME 36R	ILA	333.8 MHz CH36X	H24	313033.31N 0742412.15E	231.04M	3° RDH/TCH 51.5 FT Coverage 7-10 NM

Table 13 Radio Navigation & Landing Aids AllAP, Lahore

1.9. Communications

1.9.1. Communication frequencies for AllAP, Lahore are provided below. At the time of incident, no abnormality was reported.

Service designation	Call sign	Frequency	Hours of operation	Remarks
1	2	3	4	5
APP	Lahore APP	121.300 MHZ	H24	Primary
APP	Lahore APP	121.500 MHZ	H24	Emergency
APP	Lahore APP	125.300 MHZ	H24	Secondary
ATIS	ATIS	126.300 MHZ	H24	NIL
BS	Radio Pakistan	630.000 KHZ	HX	0130 --1900 HR
BS	Radio Pakistan	1090.000 KHZ	HX	Variable SKED
GCA	Lahore Ground	118.400 MHZ	H24	Primary
GCA	Lahore Ground	121.800 MHZ	H24	Secondary
TWR	Lahore Tower	118.100 MHZ	H24	Primary
TWR	Lahore Tower	118.875 MHZ	H24	Secondary

Table 14 Communication Facilities, AllAP, Lahore

1.10. Aerodrome Information

1.10.1. Aerodrome data of AllAP, Lahore is provided below. At the time of incident, no abnormality was reported.

Designations RWY NR	True bearing	Dimensions of RWY (M)	Strength (PCN) and surface of RWY and SWY	THR coordinates	THR elevation and highest elevation of TDZ of precision APP RWY	Slope of RWY/SWY
1	2	3	4	5	6	7
18L	180.88°	3360 x 45	110/R/B/W/T Concrete	313212.13N 0742417.44E	THR 217.65 M / 714.06 FT	0.050%
36R	0.88°	3360 x 45	110/R/B/W/T Concrete	313023.08N 0742415.49E	THR 215.93 M / 708.43 FT	-
18R	180.87°	2743 x 46	69/F/C/X/U ASPH	313202.10N 0742410.19E	THR 216.50 M / 710.30 FT	0.050%
36L	0.87°	2743 x 46	69/F/C/X/U ASPH	313033.10N 0742408.60E	THR 214.80 M / 704.72 FT	-

SWY dimension (M)	CWY dimension (M)	Strip dimension (M)	RESA dimension (M)	Arresting system	Obstacle Free Zone	Remarks
8	9	10	11	12	13	14
150 X 75	305	3724 x 300	122 x 90	-	Available	RWY Shoulder of 15M width avbl on either side of RWY 18L/36R.
150 X 75	305	3724 x 300	122 x 90	-		
244	244	3381 x 300	92 x 90	-	Available	-
274	274	3381 x 300	92 x 90	-		-

Table 15 Aerodrome Information – R/W Physical Characteristics AllAP, Lahore

1.11. Flight Recorders

1.11.1. Not Applicable.

1.12. Wreckage and Impact Information

1.12.1. Not Applicable.

1.13. Medical and Pathological Information

1.13.1. Both the Captain and the First Officer had valid medical category and were fit to undertake the flight.

1.14. Fire

1.14.1. Not Applicable.

1.15. Survival Aspects

1.15.1. Not Applicable.

1.16. Test and Research

1.16.1. Not Applicable.

1.17. Organizational and Management Information

1.17.1. Not Applicable.

1.18. Additional Information

1.18.1. **Low Visibility Procedures (LVPs)** – LVPs are specific protocols implemented at airports to ensure safe operations when RVR is low, or when decision heights are below a certain threshold. These procedures are crucial for approaches and landings, and also for take-offs when visibility is reduced.

1.18.2. LVPs are designed to facilitate safe operations during reduced visibility conditions, including Category II and Category III precision approaches and low visibility take-offs. LVPs are activated when RVR is below 550 m, or when the Decision Height (DH) is below 200 ft. LVPs aim to ensure safe transition of the aircraft from instrument guidance to visual reference during the final approach, and to manage the potential for runway incursions.

1.18.3. LVPs involve various measures, including:

1.18.3.1. **Enhanced Runway Lighting** – Ensuring clear visibility of the runway threshold, touchdown zone, and centreline, particularly in conditions with RVR less than 550 m.

1.18.3.2. **Airfield Ground Lighting** – Providing guidance through airfield ground lighting on taxiways and aprons to facilitate safe movements during low visibility.

1.18.3.3. **Surface Movement Guidance and Control System (SMGCS)** – Using systems like SMGCS to provide clear guidance and prevent conflicts on the ground.

1.18.3.4. **Communication protocols** – Establishing clear communication channels between pilots and ATC to ensure situational awareness and safety.

1.18.4. Operator's responsibilities

1.18.4.1. Operator has developed and maintain procedures for LVPs, including detailed instructions for flight crew members during taxiing, take-off, approach, landing, and missed approach operations. Flight crew members are being trained and properly qualified for LVPs, including low visibility take-off and approaches utilizing Enhanced Visual Guidance (EVS).

1.18.5. Pakistan Airport Authority

1.18.5.1. Air Traffic Handling and Coordination Procedures – Lahore Flight Information Range (FIR)

(a). The handling of arriving aircraft within Lahore FIR is carried out through a structured coordination mechanism between Area Control Centres (ACC), Approach Control, Aerodrome Control (Tower), and supporting ATS units. These procedures ensure the safe, orderly, and efficient transition of aircraft from enroute to landing phases.

- (b). As an aircraft approaches Lahore FIR, coordination is initiated between the transferring ACC (such as Delhi, Kabul, or Islamabad) and the receiving Lahore ACC sector (East, West, or South). Estimate messages containing the details of the flight including aircraft's call sign, SSR code, assigned level or altitude, and estimated time over the Transfer of Control Point (TCP) are exchanged before entry. Any modification to the estimate are communicated without delay. Changes to flight levels are only made after prior coordination and approval between the respective ACC units.
- (c). Upon receiving the aircraft, Lahore ACC issues initial descent clearance, generally down to FL150, depending on traffic sequencing and available capacity. Further descent and radar vectors for approach are then coordinated between the ACC and Lahore Approach Control to ensure seamless sequencing into the terminal area.
- (d). Control of the aircraft is transferred to Lahore Approach before the aircraft reaches the Control Zone (CTR) or Terminal Control Area (TMA) boundary. This handover includes detailed information such as the call sign, SSR code, assigned altitude or heading, and estimated boundary crossing time. In radar-controlled environments, this process may also be completed electronically through a radar handover. Once under the jurisdiction of Approach Control, further descent instructions are issued, and the aircraft is integrated into the arrival stream using radar vectoring or established arrival procedures.
- (e). Lahore Approach sequences arriving aircraft and coordinates with the Aerodrome (Tower) Controller as the aircraft nears final approach. The Tower, once the aircraft is established on final approach, issue the landing clearance based on R/W availability, current weather, and visibility conditions. Any significant updates affecting approach or landing are relayed to the aircraft at this stage. Upon landing, the exact touchdown time is recorded and shared with FDA Tower for onward coordination.
- (f). After clearing the R/W, the aircraft is handed over to the Ground Movement Controller for taxi to its assigned stand or parking bay. Coordination at this stage may involve apron control and ground handling agencies, ensuring the aircraft reaches its designated location safely and efficiently.

1.19. Use of Effective Investigation Techniques

- 1.19.1. Standard investigation procedures and techniques were used.

SECTION 2 – ANALYSIS

2.1. General

2.1.1. On 17 January, 2025, PK-150 stumbled upon a safety incident of landing at wrong runway at AllAP, Lahore. PK-150 a scheduled commercial flight which operated between OEDF Dammam, Saudi Arabia, and MIAP, Multan. Due to the adverse weather conditions (heavy fog with poor visibility) at its intended destination i.e. MIAP, Multan, PK-150 diverted to AllAP, Lahore.

2.1.2. Upon approach, ATC cleared the aircraft to land on RW 36R at AllAP. However, at time 023600, the aircraft landed on RW 36L instead of RW 36R due to misalignment and landed safely without further incident.

2.1.3. The occurrence was analysed based on Flight Data Recorder (FDR), Cockpit Voice recorder (CVR), Radar & Radio data, interview with aircrew, ATCOs, PIA supervisors (Director Operations, Chief of Safety, Chief Pilot Training, Sim instructor), PAA supervisors (Director Operations, COO, RFC, CNS, and DD Training CATI) and pilot training record.

2.1.4. Ground operations were all normal and aircraft departed Damam at 2327Z. No abnormality was reported in the aircraft. During departure at Damam, the reported visibility at Multan was 1,200 m well above ILS CAT-1 minima for landing, however while enroute at 0100Z (17 Jan, 25) the visibility at Multan rapidly dropped to 50 m due Fog. After, assessment of latest weather conditions for Multan, Karachi and Lahore and with sufficient fuel available, the Captain decided to divert to Lahore. The reported visibility for Lahore at 0100Z was 300 m RVR 400 m.

2.1.5. Both flight crew were medical fit to undertake subject flight. They were adequately rest with no fatigue factor and were operating with in Flight Duty Timeline (FDTL). Captain was Pilot Flying (PF) and First Officer was Pilot Monitoring (PM) for the subject flight.

2.1.6. Both aircrew are qualified on Crew Resource Management (CRM) training and have undergone LVP in Nov 24. However, PF had landed twice in life in actual LVP conditions besides practices simulated conditions.

2.2. Flight Operations

2.2.1. During planning phase, the diversion airfield were Islamabad and Karachi. However, PF decided to divert to Lahore as being close to plan landing field to facilitate passenger comfort. Moreover, PF being the captain of aircraft can change the alternate during flight as per policy. The decision seems correct while facilitating passenger comfort and company management, however, no consideration was kept in mind, that diversion increases the stress level. Selecting an alternate airfield with tougher landing conditions is contrary to safe recommended procedures. Moreover, as there was no technical anomaly reported on aircraft which require immediate or as soon as practical landing, the decision making and situation awareness of PF needs re-evaluation as it had comprised the overall safety environment.

2.2.2. After deciding to divert and LVP enforced at Lahore, data in FMS was fed by PM instead of PF. A clear violation of procedure by PF as it is mandatory to feed in data in FMS by PF and cross check by PM. Moreover, both pilots individually carried out FMS cross checked data but failed to recognize and could not identify the mistake (36L instead of 36R) while cues available on Navigational Display (ND). The pictorial display of diversion flight plan from simulator is depicted below: -

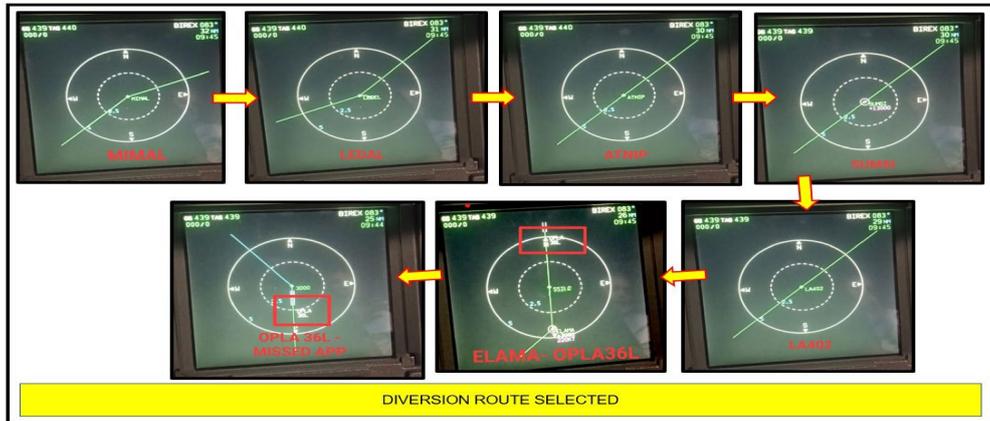


Figure 4 Diversion route selected display on ND

2.2.3. During CVR analysis it has been observed that the handing taking over controls and radio between PF & PM was without announcing standard communication. Moreover, after offering Fajr (morning prayers) by PF till landing, it was difficult to identify who is PF or PM. A clear violation of standard communication and PF & PM task sharing procedures due relaxed cockpit environment.

2.2.4. Moreover, while interviewing PIA supervisors at various level, it was analysed PIA possess various tracking system. However, PIA flight crews exhibit nonstandard communication and briefings during routine operations. Supervisors need to re-evaluate training effectiveness and ensure strict compliance with standard procedures through regular monitoring.

2.2.5. **Wrong selection of runway by PM during FMS data feeding** – It is pertinent to highlight that while carrying out HAT checks in A320 aircraft on Flight Plan Page once destination is selected OPLA and on its arrival page the 1st page indicates ILS36L-Y (109.7), ILS36L-Z (109.7) & ILS36R-Y (109.9) and on 2nd page ILS36R-Z (109.9), LOC36L-Y & LOC36L-Z as shown in figure below: -



Figure 5 Correct Settings to select OPLA ILS-36R-Z (pg1 of FMS)



Figure 6 Correct Settings to select OPLA ILS-36R-Z (pg2 of FMS)

2.2.6. During interview with PM accepted his mistake by wrong selection of ILS frequency. The PM selected ILS36L-Z (109.7) displayed on 1st arrival page (marked in red box) instead of ILS36R-Z (109.9) on 2nd arrival page as shown in figure below: -



Figure 7 Wrong selection of frequency on FMS

2.2.7. PF commenced pre-descend briefing while going through FMS where number of times he announced OPLA 36R, ILS 36R Z and at one time announced ILS frequency as 109.7 which was also cross check by PM. Here there is contradiction that PF announcing ILS 36R Z whereas frequency of ILS 36L Z was selected on FMS. During interview with PF & PM, both aircrews accepted their mistake as both PF & PM failed to cross check ILS frequency during descend, approach and landing checks and could not identify from various cues available on FMS, Primary Flight Display (PFD) & ND. Failure to conduct proper checks as both pilots clearly suffered a severe loss of situational awareness. Despite correctly communicating the intended runway with ATC & among themselves, they failed to maintain awareness of their cockpit setting and the correct runway environment. Moreover, PF have been influenced (Anchoring Bias) announcing ILS frequency wrong 109.7 as he has conducted a greater number of landings on RW 25L (JIAP, Karachi) having same frequency.



Figure 8 Correct settings for OPLA ILS36R-Z

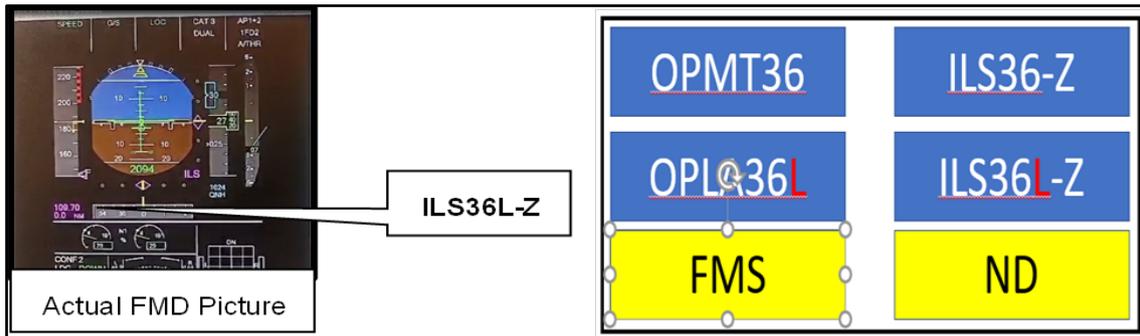


Figure 9 FMD Display

2.2.8. Moreover, PF & PM were so engrossed in LVP brief and took considerable time to revise LVP. During LVP briefing by PF, PM was lagging and was not attentive as number of times, PF had to guide and assist him to view at right place and correct data feeding. This speaks of poor knowledge level of PM. Furthermore, they did not revise Failures and Associated actions & Airport Lighting System and Runway markings section during LVP briefing.

2.2.9. As there is huge difference in Airfield Lighting System (AFLS) between CAT-I & CAT-III. The CAT-III AFLS includes undershoot, Center line & Touch down zone well illuminated with high intensity lights. Both pilots failed to recognize the AFLS in RVR 700 m.

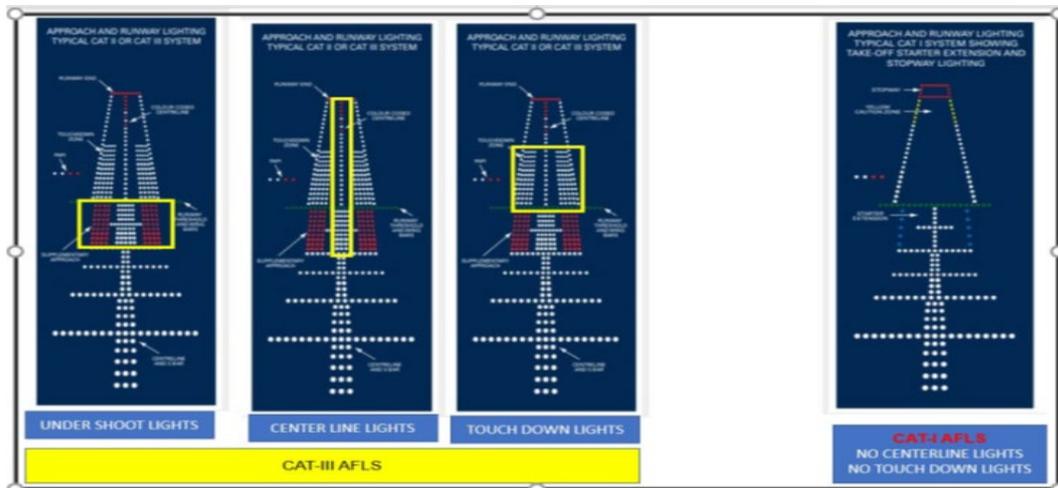


Figure 10 CAT-III AFLS OPLA



Figure 11 Aerial View of both R/W Approach and R/W Lights

2.2.10. **ATC Analysis** – Early changed over by Approach controller assuming PK-150 fully established on Glide Slope at 10 NM as announced by PM, however, the aircraft was still turning and remained towards left of track. The changeover to Tower could have been delayed till stabilization of approach, however, as in routine, he shifted his responsibility to tower controller and continued to monitor.

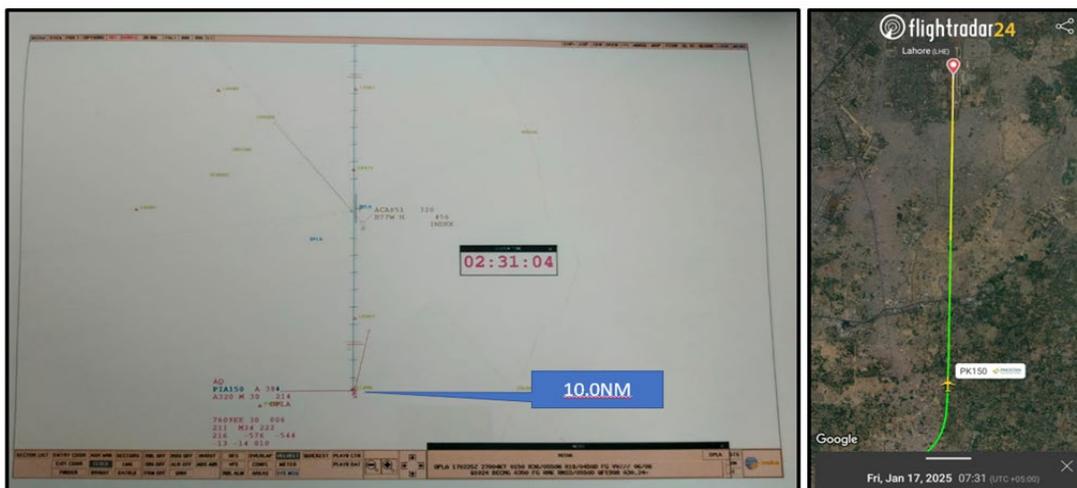


Figure 12 PK-150 established on Glide Slope at 10NM

2.2.11. Tower controller gave landing clearance to PK-150 for RW 36R at 5.6 NM which was acknowledged by PM. However, tower controller being not visual with the aircraft due poor visibility failed to monitor aircraft on Radar Screen displayed in tower until prompted by Approach controller on landline that aircraft is left of track. At this moment, the aircraft was at approx. 1.7 NM from touchdown point. Same was communicated (observed left of track) to PK-150 by tower controller. Seeing the aircraft left of track by tower controller rather than giving Go-round, the tower controller switched ON RW 36L approach light to facilitate landing. During Radio readout of approach and tower controller, it was revealed that both the Approach & tower controller were hesitant (feared) to give “Go-round” to aircraft and they were conversing in fear whether to give Go-round or not, hence, to facilitate, the tower controller switched ON the approach lights, this could have led to disastrous situation

during landing roll. Seeing aircraft clearly aligned with RW 36L either of Approach or tower controller) should have given call for “Go-round”. Moreover, during such situation if Tower controller had included RW 36L in his call (“observed left of track in line with RW 36 left”) that might have alerted the flight crew to initiate “Go Around”.

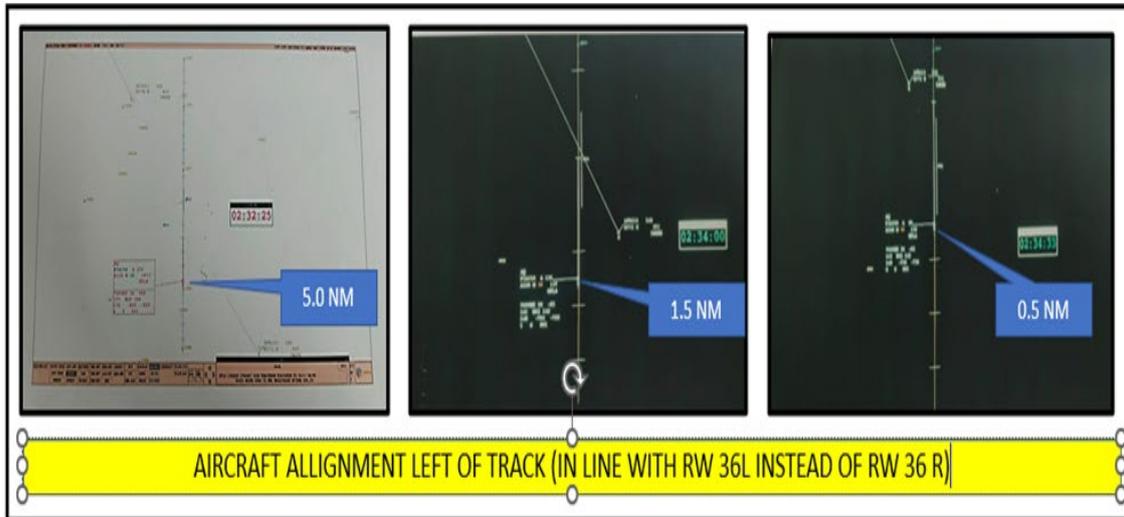


Figure 13 PK-150 observed Left of Track

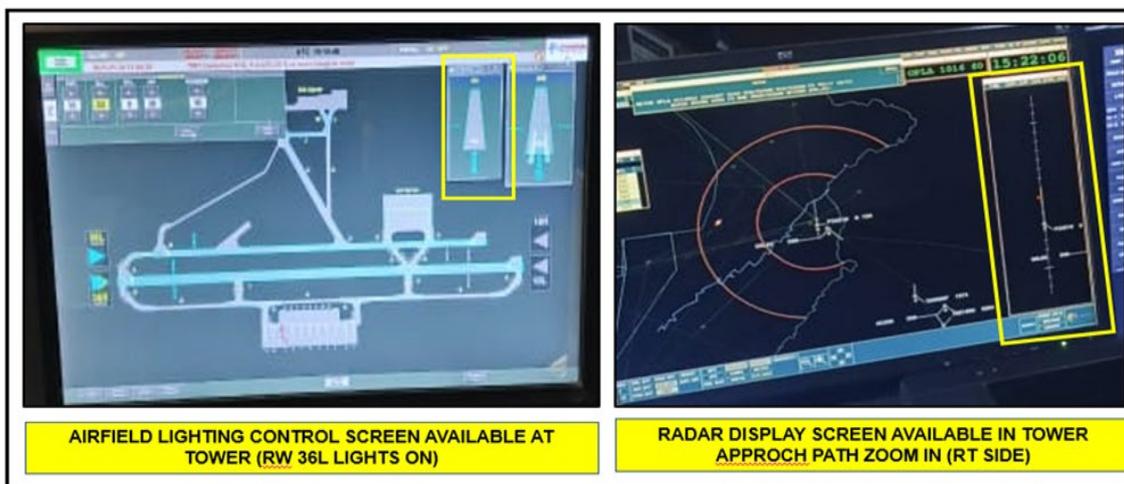


Figure 14 AFLS and Radar Display screen at Control Tower

2.2.12. During interview with both Controllers, it has been learnt that both Air Traffic Controllers were hesitating to give “Go-Round” as it has been drilled in mind that its pilot responsibility. ATCs hesitate to issue Go-Around instructions due to pressure from higher authorities, with instances of license or rating cancellations creating a culture of fear. This hesitancy to intervene during critical phases reflects systemic cultural issues and training deficiencies.

2.2.13. **Landing Analysis** – From establishing on Glide slope at 8.6 DME, till landing, both PF & PM were more focus for alignment and flight path on PFD (Glide slope). Despite ATC call “Observe left of track” did not prompted flight crew to verify with other cues available on PFD, ND and FMS, however, just kept reliance on ILS cross bar and diamonds on PFD and continued approach for landing on RW 36L.

2.2.14. Moreover, PM announced field insight at distance of 0.5 NM (3,000 ft) from threshold, whereas, PF did not announce anything. It's a clear violation by PM as it is mandatory to be heads down during CAT-III landing and keep rechecking all parameters.

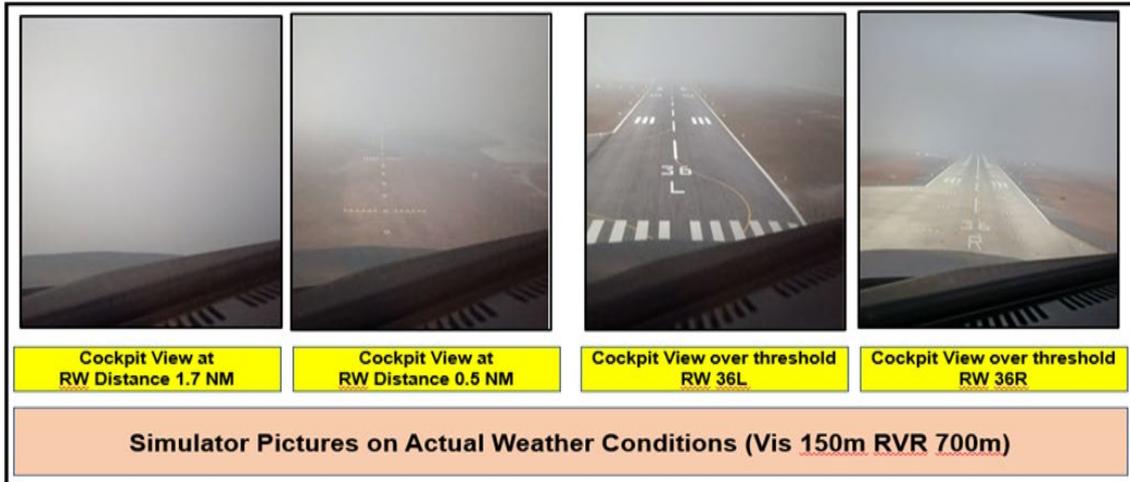


Figure 15 Simulator pics on Actual weather Conditions (Visibility 150m RVR 700m)



Figure 16 PFD

2.2.15. Both aircrew realized that they landed on wrong R/W at end of landing roll. The aircraft touchdown left half of R/W 36L (Nose wheel approximate 47 ft from centreline whereas the left wheel touchdown approximately 59.5 ft), thus leaving margin error of approximate 15 ft from R/W edge. Moreover, the aircraft carried out CAT-III B ILS Approach in Auto Land Mode on CAT-I ILS capability, any deviation could have been catastrophic (182 souls on board).

2.2.16. During review of pilot training folders, all entries are made in blue ink pen and it was difficult to find out weak areas. Moreover, some grade slips are not filled properly by sim instructors as they have marked SB (satisfactory with Brief) against specific exercises, however, failed to describe in writing exact weak area.

2.2.17. Pilot Flying (PF) Observation.

2.2.17.1. **Lack of Record for LVP Approaches** – Although the PF statement mentions that the individual has conducted two LVP in his career, but there was no record available in the training folder.

2.2.17.2. **Decision Making and Assertiveness** – PF displays indecisiveness, especially noted in the behaviour while communicating with PIA ground control. Despite making a decision to divert to Lahore, the PF was still in a suggestive, non-assertive tone, rather than decisively communicating the action. This suggests a lack of assertiveness and poor decision-making skills.

2.2.17.3. **Instructor Evaluation** – The lack of assertiveness and decision-making issues weren't identified by the instructors, which points to a potential gap in assessment or training feedback.

2.2.18. Pilot Monitor (PM) Observation.

2.2.18.1. **Training and Performance** – The PM's training folder indicates poor performance in several areas.

2.2.18.2. **Flight Mode Annunciator (FMA) Issues** – There is an indication that the PM struggles with understanding or responding to information on the Flight Mode Annunciator, which is crucial for situational awareness.

2.2.18.3. **Poor Situational Awareness (SA)** – Number of entries is noted for poor situational awareness in PM folder.

2.2.18.4. **Rote Learning** – The PM's learning seems to be mechanical rather than integrated into real-world decision-making.

2.2.18.5. **Simulator Training Issues** – The PM failed during their Captain training simulator session on the Airbus 320, and was under observation for both simulator and line training afterward. Despite this, the PM again failed the subsequent simulator checks, including a PCAA check. These failures were attributed to poor Flight Management Computer (FMC) understanding and poor situational awareness.

2.2.18.6. **Ongoing Performance Issues** – Despite a year of continued observation and additional training, the PM failed again, suggesting that the weaknesses weren't adequately addressed or corrected.

2.2.18.7. **Training Record** – PM training folder depicts number of similar observations as mentioned above made during his entire carrier on various aircraft. However, these observations were not timely checked and addressed by supervisors and training instructors, which have led to this serious incident.

2.3. Organizational Factors

2.3.1. PIA

2.3.1.1. **Delegation with Limited Oversight** – Current delegation practices indicate the need to further strengthen supervisory engagement and alignment with ICAO Annex 19 (Safety Management) oversight principles, thereby ensuring continued enhancement of operational safety standards.

2.3.1.2. **Tracking systems** – PIA possesses multiple tracking systems; however, deficiencies persist in evidence-based cockpit assessments, task-sharing between PF and PM, and crew compatibility during flight scheduling. Additionally, weak performance areas are not clearly identified in training grade slips and continue to be ambiguously marked as “*Satisfactory with Brief,*” despite formal circulars issued by PIA supervisors directing detailed elaboration of such remarks.

2.3.1.3. PIA flight crews exhibit nonstandard communication and briefings during routine operations. Supervisors need to re-evaluate training effectiveness and ensure strict compliance with standard procedures through regular monitoring.

2.3.1.4. PIA as an organization has shown notable progress in addressing previous shortcomings, particularly by enhancing pilot training through the adoption of evidence-based training methodologies and reinforcing internal oversight mechanisms.

2.3.2. Pakistan Airport Authority.

2.3.2.1. **Pressure Against Go-Arounds** – Fear of punitive actions culture is prevailing which undermines ATCs' confidence, shifting critical safety decisions solely to pilots and non-decisive attitude by ATCs.

2.3.2.2. **Shift and Rest Policy Gaps** – Non-compliance with ICAO rest period recommendations increases fatigue-related risks. Extended night shifts negatively affect cognitive performance due to circadian rhythm misalignment.

2.3.2.3. **Lack of Supervisory Oversight** – Absence of night-time supervision reduces accountability and support for night shift ATCs.

2.3.2.4. **Inconsistent Leave Policy** – Unclear leave policy leads to inconsistent staffing levels, further exacerbating workload issues.

2.3.2.5. **Delay in Critical Information sharing with investigators** – Delayed disclosure of R/W 36L approach light status, known to AllAP within two hours of occurrence but shared same after five days on investigation by BASIP. This delay hindered timely analysis and prolonged uncertainty, possibly affecting corrective measures. Moreover, it eroded trust between investigation authorities and AllAP, Lahore operational staff, hindered timely analysis and eroded trust between the individuals.

2.3.2.6. **Impact of Manpower Shortage** – AllAP, Lahore operates with 75 ATCOs against an establishment of 113 (including managerial post and OJT). Five shift duty roster is being maintained catering for active duties, managing managerial posts, OJT, sickness, leave and courses. Moreover, with this posted strength, ATCOs are not being relieved for career progression courses.

2.3.2.7. The ongoing shortage of ATC manpower has been significantly exacerbated by employment restrictions imposed by the Government of Pakistan (GoP) over the past two years. This situation has reached to critical level due to the retirement of a substantial number of Air Traffic Control Officers (ATCOs). In several instances, ATCOs have been found absent from their designated control stations due to various reasons, further straining the already limited ATC human resources. This increased workload on the remaining ATCOs poses a serious risk to operational safety.

2.3.2.8. Additionally, there is an evident lack of supervision during night shifts at airports. Operational supervisors are currently fulfilling their duties only during daytime hours, resulting in supervisory gap during night operations, thus compromising safety and oversight.

2.3.2.9. **Delays in On Job Training (OJT)** – OJT of ATCOs at AllAP are compromised as defined timelines are not being met either by OJT Instructors or by Training In charges, thus hampering the timely availability of operational status of ATCOs.

2.3.2.10. **Electronic Limitations** – Ground ILS equipment at Karachi, Lahore and Islamabad simultaneous transmit and there is no provision provided in system to separately operate to avoid such recurrence in future by switching off one ILS system for the R/W in use especially during LVP conditions. Moreover, though not being part of investigation, the number of radar screens at ACC Lahore have been faded out which may lead to misinterpretation of data, affecting situational awareness of ATCOs and may compromise safety in future.

2.3.3. **Pakistan Civil Aviation Authority (PCAA).**

2.3.3.1. **Operational Implications of Shared feed-in points** – The feed-in points for ILS approaches at **Karachi, Lahore, and Islamabad** are similar, which can make it challenging for flight crew and controllers to promptly determine the R/W with which an aircraft has aligned. Especially, the use of the same IF (ELAMA) for both parallel ILS Z approaches for R/W at Lahore could increase the likelihood of R/W misidentification, especially in low visibility. ICAO Doc 8168 – Procedures for Air Navigation Services (PANS-OPS), emphasizes the importance of clear and unambiguous procedure design to ensure safety and efficiency.

SECTION 3 – CONCLUSIONS

3.1. Findings

3.1.1. Human Factor.

3.1.1.1. **Situational Awareness Deficiency** – Both the PF and PM displayed poor situational awareness, failing to identify cues from flight instruments and ATC communications indicating misalignment with the intended R/W.

3.1.1.2. **Decision-Making Flaws** – The PF’s decision to divert to Lahore without fully considering safer alternatives suggests compromised decision-making under stress.

3.1.1.3. **Communication Gaps** – Lack of standard phraseology during critical phases of flight, such as unclear roles, contributed to confusion in cockpit dynamics.

3.1.1.4. **Training Deficiencies** – PM exhibited continuous performance issues in simulator sessions, poor understanding of FMA, and reliance on rote learning.

3.1.2. Crew Resource Management (CRM).

3.1.2.1. **Ineffective Cross-Checking** – The PF and PM failed to cross-check ILS frequencies, an elementary CRM procedure.

3.1.2.2. **Poor Role Clarity** – After mid-flight changes, roles between PF and PM were blurred, affecting task management. Poor exhibit of PF & PM task sharing procedures.

3.1.2.3. **Inadequate Briefings** – The pre-descent briefing lacked thorough verification of critical data.

3.1.3. Organizational Culture

3.1.3.1. **Fear-Based ATC Environment** – ATCOs hesitated to issue a “Go-Around” due to fear of punitive actions from their supervisors, reflecting a toxic safety culture.

3.1.3.2. **Lack of Proactive Oversight** – PIA’s supervisors showed inadequate oversight, with no routine cockpit monitoring or spot checks.

3.1.3.3. **Inconsistent Safety Prioritization** – The delay in communicating critical information post-incident highlights a culture of information suppression.

3.1.4. Supervisory Lapses.

3.1.4.1. **PIA** – Supervisors exhibited limited oversight, characterized by an overreliance on subordinate staff for handling reported cases and insufficient involvement in safety monitoring and operational decision-making. These factors collectively reduced situational awareness and contributed to a weakened safety culture.

3.1.4.2. **PAA** – Senior airport supervisory level monitoring and oversight were observed to be lacking during night-time ATC operations. Furthermore, ineffective shift and rest management policies, together with non-adherence to ICAO fatigue management standards, contributed to increased fatigue levels among ATCOs and reduced decision-making effectiveness.

3.2. Cause / Contributory Factors

3.2.1. Cause

3.2.1.1. The cause of occurrence is attributed to wrong selection of ILS frequency as both flight crew failed to monitor wrong runway selection despite number of cues available in cockpit during various stages of flight

3.2.2. Contributory Factors

3.2.2.1. Poor exhibit of PF & PM task sharing procedures by both aircrews reflecting a breakdown in CRM.

3.2.2.2. PM failed to register ILS 36R-Z on the FMS arrival page and incorrectly selected ILS 36L-Z while preparing the diversion flight plan. Moreover, PF exhibited lack of attention while cross checking diversionary route on FMS. Additionally, PM training folder showed persistent performance issues in simulator sessions, poor understanding of the FMA and reliance on rote learning.

3.2.2.3. Despite misalignment, both ATCOs hesitant to give “Go-Around” due to fear of punitive actions from their supervisors, reflecting a toxic safety culture.

3.2.2.4. Supervisory deficiencies both at PIA and PAA, characterized by insufficient oversight and overreliance on subordinates, undermined safety monitoring contributed to weakened safety culture.

Note: Aviation Occurrence Category (ADREP Taxonomy)

“Navigation errors (NAV)” – Incorrect navigation of aircraft on the ground or in the air.

Failure to follow clearances or restrictions while operating on the surface of an aerodrome, including –

- o Approaches or landings to/on unassigned runways or to/at the wrong aerodrome

SECTION 4 – SAFETY RECOMMENDATIONS

4.1. Safety Recommendations

4.1.1. PIA (Pakistan International Airlines)

Training Enhancements:

4.1.1.1. Revise CRM and LVP training modules with emphasis on situational awareness and real-time decision-making.

4.1.1.2. Reassess and retrain PM with a focus on FMC operation, FMA understanding, and approach procedures.

4.1.1.3. Reinstate PF on flying duties after requisite refresher training and clearances.

4.1.1.4. Filling weak areas in red ink pen on grade slips by evaluating instructors and details of weak area are to document once grading 'SB' or 'U'.

Operational Oversight:

4.1.1.5. Implement regular line checks and conduct cockpit audits by team of Flight Operations, Training and Safety department.

4.1.1.6. Establish a robust mentorship program for struggling pilots.

Improve Training and CRM:

4.1.1.7. Enhance training programs for flight crews on procedural compliance and CRM.

4.1.1.8. Conduct regular refresher training sessions focused on low-visibility procedures and emergency decision-making.

4.1.1.9. Incorporate scenario-based training emphasizing human factor vulnerabilities, such as expectation bias and communication breakdowns.

4.1.2. PAA (Pakistan Airports Authority)

ATC Training and Policy Reforms:

4.1.2.1. Mandatory refresher training may be conducted on assertive communication and decision-making during critical phases.

4.1.2.2. Incorporate scenario-based training emphasizing human factor vulnerabilities, such as expectation bias and communication breakdowns.

4.1.2.3. Implement standardize OJT timelines for ATCOs in line with ICAO guidelines to ensure timely operational readiness.

4.1.2.4. Redesign effective ATC shift schedules to align with ICAO fatigue management standards and effective involvement of senior airport supervisory level for monitoring and oversight during night shift.

4.1.2.5. Reinstate Approach and Tower controller on ATC duties after requisite refresher training and clearances.

4.1.2.6. FAM sorties may be included in training curriculum to give awareness on air situation thus enhancing safety and situational awareness of controllers.

4.1.2.7. Enhance training programs for ATCOs on procedural compliance and CRM.

Oversight:

4.1.2.8. Increase involvement and commitment of Operational Supervisors towards operations rather than on non-operational managerial tasks.

4.1.2.9. Establish a robust OJT program for timely completion.

4.1.2.10. Ensure installation of monitoring systems (CCTV) for accountability at all control towers and ACCs.

4.1.2.11. Regular spot checks of tower and ACC are to be conducted by senior PAA supervisors.

4.1.2.12. **Infrastructure Improvements** – PAA may upgrade the ILS ground equipment at major airports to include independent control functionality for each runway's ILS system, allowing selective activation during operations—particularly under Low Visibility Procedures (LVP). Additionally, faded out radar display screens may be reassessed and replaced to ensure accurate data presentation for controller situational awareness and operational safety.

4.1.2.13. **Shortage of Manpower** – Enhance induction of ATCOs may be conducted to overcome HR shortage in ATCs keeping in view the capacity of existing training setup.

4.1.3. PCAA (Pakistan Civil Aviation Authority)

Regulatory Reforms:

4.1.3.1. A case study to be conducted to evaluate the feasibility of establishing distinct ILS feed-in points at Karachi, Lahore & Islamabad airports. This measure would help to reduce the risk of misinterpretation of ATC clearances and enhance overall aviation safety.

4.1.3.2. The existing practice of marking weak areas on all types of flying/ ground training and simulator grade slips across operators using blue ink, as per current regulatory guidelines, warrants review. It is recommended that these areas be marked in red ink to enhance visibility. This deviation, if standardized, could assist supervisors in promptly identifying individual performance deficiencies and initiating timely remedial actions.

4.1.3.3. Ensure the implementation of standardized On-the-Job Training (OJT) timelines for Air Traffic Control Officers (ATCOs) across all Pakistan Airports Authority (PAA) facilities, in accordance with ICAO guidelines.

4.1.3.4. Ensure robust oversight and the systematic conduct of audits pertaining to pilot training across all operators, with particular focus on identifying and rectifying any procedural non-compliance or deviations by the respective operators.