

FINAL INVESTIGATION REPORT



SERIOUS INCIDENT LANDING ON WRONG RUNWAY

**SAUDI AIRLINES FLIGHT SVA-724 BOEING 777-368 (ER)
REG NO HZ-AK21 AT IIAP, ISLAMABAD ON 14-10-2024**

SCOPE

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ABBREVIATIONS

ACC	Area Control Centre
AIP	Aeronautical Information Publication
APP	Approach Control
BASIP	Bureau of Aircraft Safety Investigation Pakistan
BEA	Bureau of Enquiry and Analysis
CRM	Crew Resource Management
FIR	Flight Information Region
FL	Flight Level
ICAO	International Civil Aviation Organization
OPIS	Islamabad International Airport, Islamabad
ILS	Instrument Landing System
IOU	Incident Occurrence and Unserviceability Report
kg	Kilogram
l	litre
NM	Nautical Miles
NSC	No Significant Clouds
OERK	King Khalid International Airport, Riyadh, Saudi Arabia
PAA	Pakistan Airports Authority
PASI	Pakistan Air Safety Investigation
PMD	Pakistan Meteorological Department
RW	Runway
RNAV	Radio Navigation
SOP	Standard Operating Procedures
STARs	Standard Terminal Arrival Routes
TAC	Total Aircraft Cycles
TAH	Total Aircraft Hours
UTC	Universal Time Coordinated
VHF	Very High Frequency Omnidirectional Range

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 and Aviation Investigation Bureau, Kingdom of Saudi Arabia 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 14 October 2025, Saudi Arabian Airlines flight SVA-724, Boeing 777-368(ER) aircraft, Reg No. HZAK-21 encountered a serious incident regarding landing on wrong Runway (RW) at Islamabad International Airport (OPIS), Islamabad.

SVA-724 was a scheduled commercial passenger flight, which departed from King Khalid International Airport (OERK), Riyadh Saudi Arabia to Islamabad International Airport, Islamabad Pakistan. SVA-724 was operating under normal conditions however, the aircraft erroneously landed on runway 10L instead of the assigned runway 10R, highlighting significant procedural and communication lapses with potential safety risks.

There were no injuries or damages reported, neither to the aircraft nor to any person on the 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 14 October 2024, Saudi Arabian Airlines flight SVA-724, Boeing 777-368ER aircraft, bearing Reg No. HZAK-21 took off from King Khalid International Airport (OERK), Riyadh, Saudi Arabia for Islamabad International Airport (OPIS), Islamabad and entered Pakistan airspace via Air Traffic Services (ATS) route PG – G325 – HANGU – J139 – KALMI – OPIS.

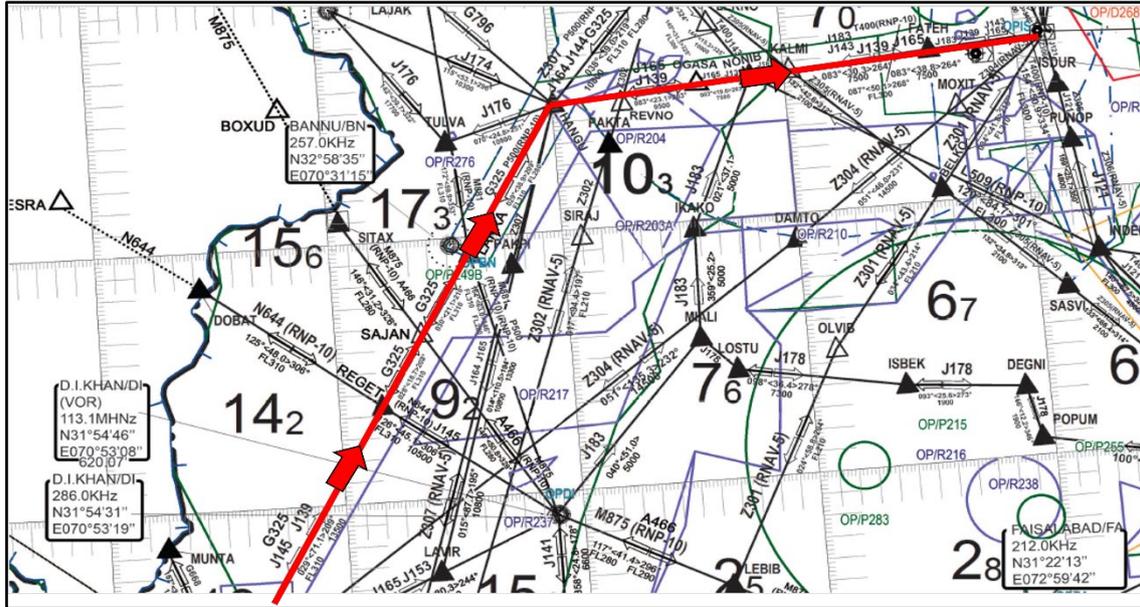


Figure 1 SVA-724 Flight Route

1.1.2. Before entering the Pakistan airspace, SVA-724 flight remained un-eventful.

1.1.3. **020335.** SVA-724 contacted Islamabad Area Control while maintaining Flight Level 300 (FL300). After identification, the aircraft was instructed to descend FL 210 and follow the flight plan route to position KALMI, thereafter SUMEB and from SUMEB to IS416 for ILS Z Approach RW 10R,

1.1.4. **020356.** The pilot read back half of the ATC clearance mentioning *Descent to FL 210 and follow flight plan route to KALMI then SUMEB.*

1.1.5. **020407.** The controller repeated the ATC clearance, stating *after SUMEB IS416 followed by ILS Z Approach RW 10R.*

1.1.6. **020414.** The second read back by pilot was also incomplete, till IS416, and did not mention the Approach or RW 10R.

1.1.7. **020705,** Islamabad Area Control directed SVA-724 to contact Cherat Approach on frequency 127.350 MHz, while terminating the radar services.

1.1.8. **020725.** Cherat Approach Controller instructed SVA-724 to continue descend to FL150 and to proceed direct to position KALMI.

1.1.9. **021420.** SVA-724 was given further descend to 11000 ft followed by 7000 ft, and upon reaching position KALMI was instructed to contact Islamabad Approach on frequency 121.650 MHz.

1.1.10. **021828.** SVA-724 contacted Islamabad Approach at position KALMI and was reissued ATC Clearance for ILS Z Approach RW 10R, with descent to 5,000 ft.

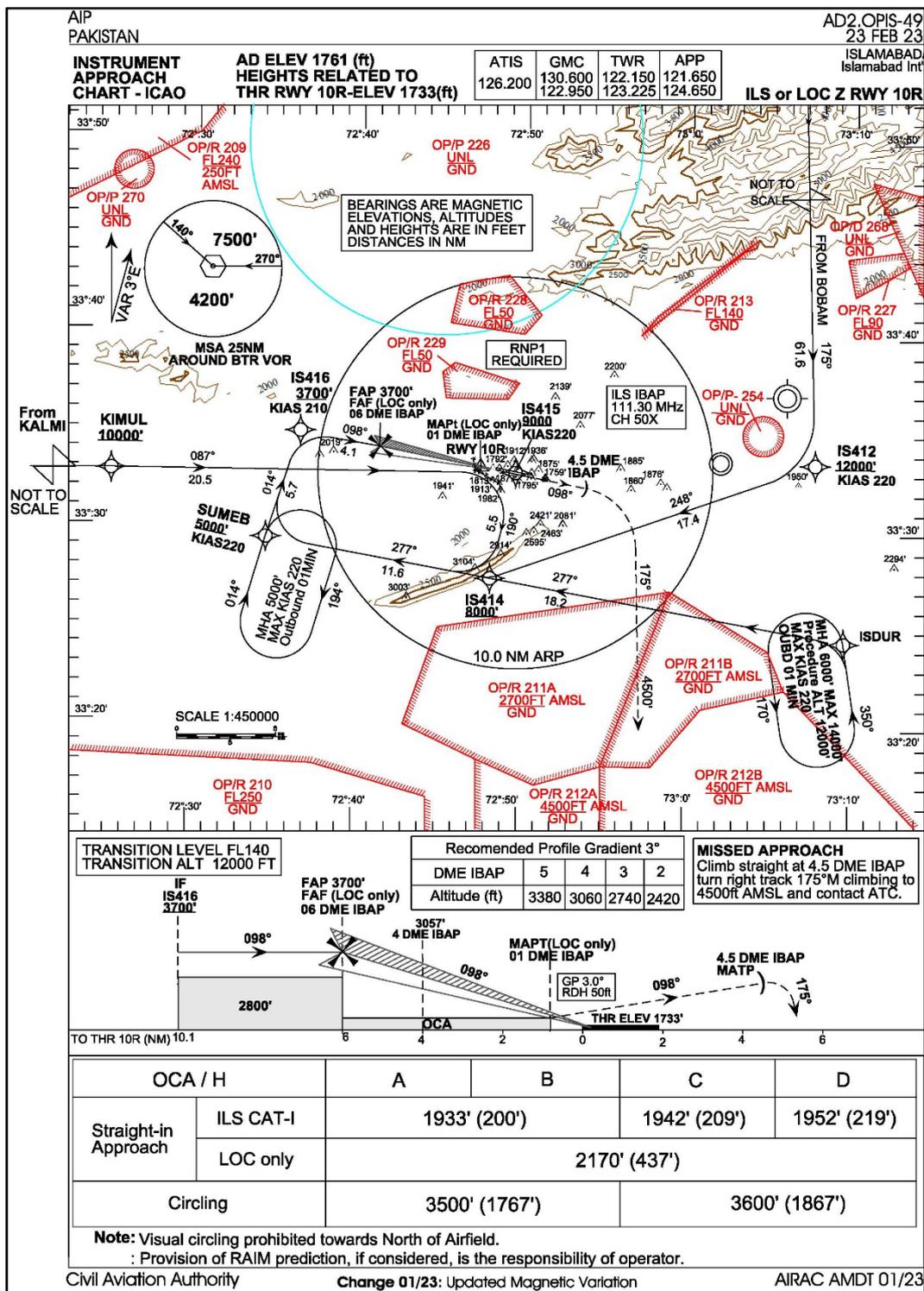


Figure 2 ILS-Z RW 10R OPIS, Islamabad

- 1.1.11. **021838.** SVA-724 again read back the ATC clearance for SUMEB followed by IS416, but **did not mention the type of Approach or Runway.**
- 1.1.12. **022424.** SVA-724 started descent to 3,700 ft as published in the Aeronautical Information Publication (AIP) and was advised by the Approach Controller to report established.
- 1.1.13. **022607.** Approach Controller passed latest QNH 1015 to SVA-724 but the read-back by the Saudi pilot was not clear.

1.1.14. **022622.** Approximately 08 Nautical Miles (NM) from RW 10R, SVA-724 was changed over to Islamabad Tower on frequency 122.150 MHz.

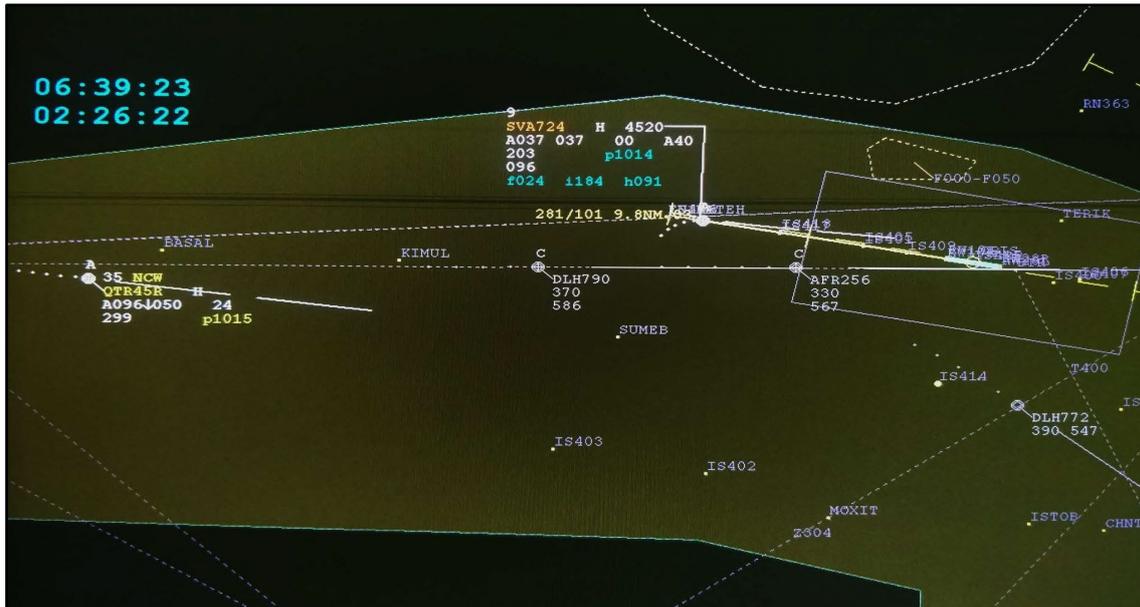


Figure 3 Change over to Islamabad Tower frequency

1.1.15. **022641.** SVA-724 contacted Islamabad Tower and reported “established”. Tower Controller issued a landing clearance explicitly stating: “Clear to land RW 10R”, along with caution for birds, wind and gear check. **but the read back by SVA-724 only stated RW 10 without mentioning Left (L) or Right (R).**

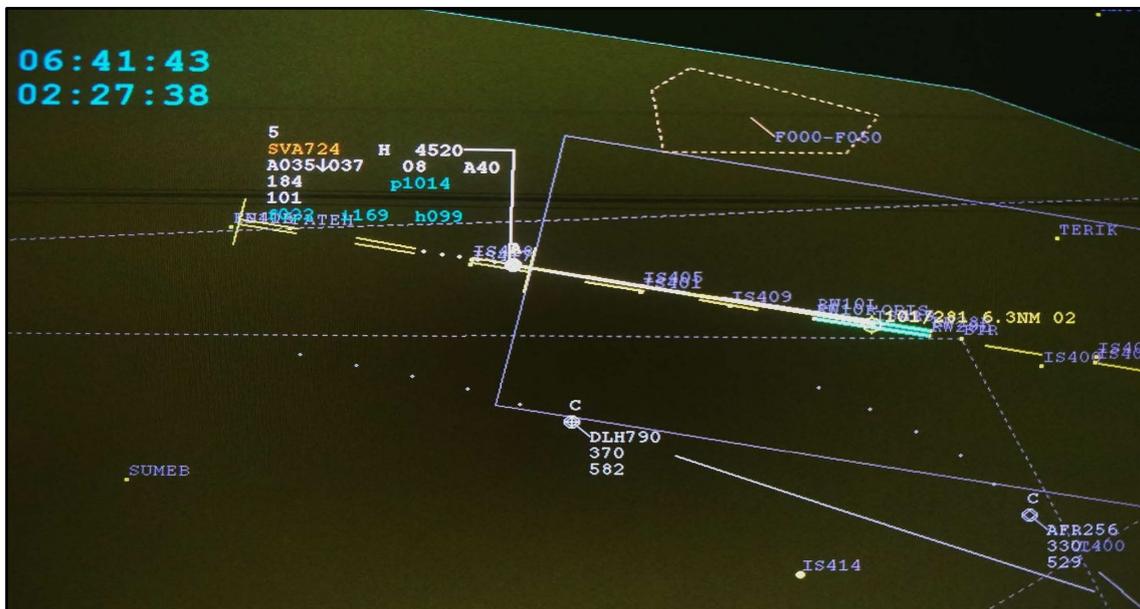


Figure 4 Landing clearing by ATC

1.1.16. **023014.** SVA-724 landed on RW 10L instead of the cleared RW 10R.

1.1.17. **040653.** SVA-724 contacted Islamabad Tower stating that the aircraft was cleared for RNP Approach RW 10L instead of ILS Approach RW 10R.

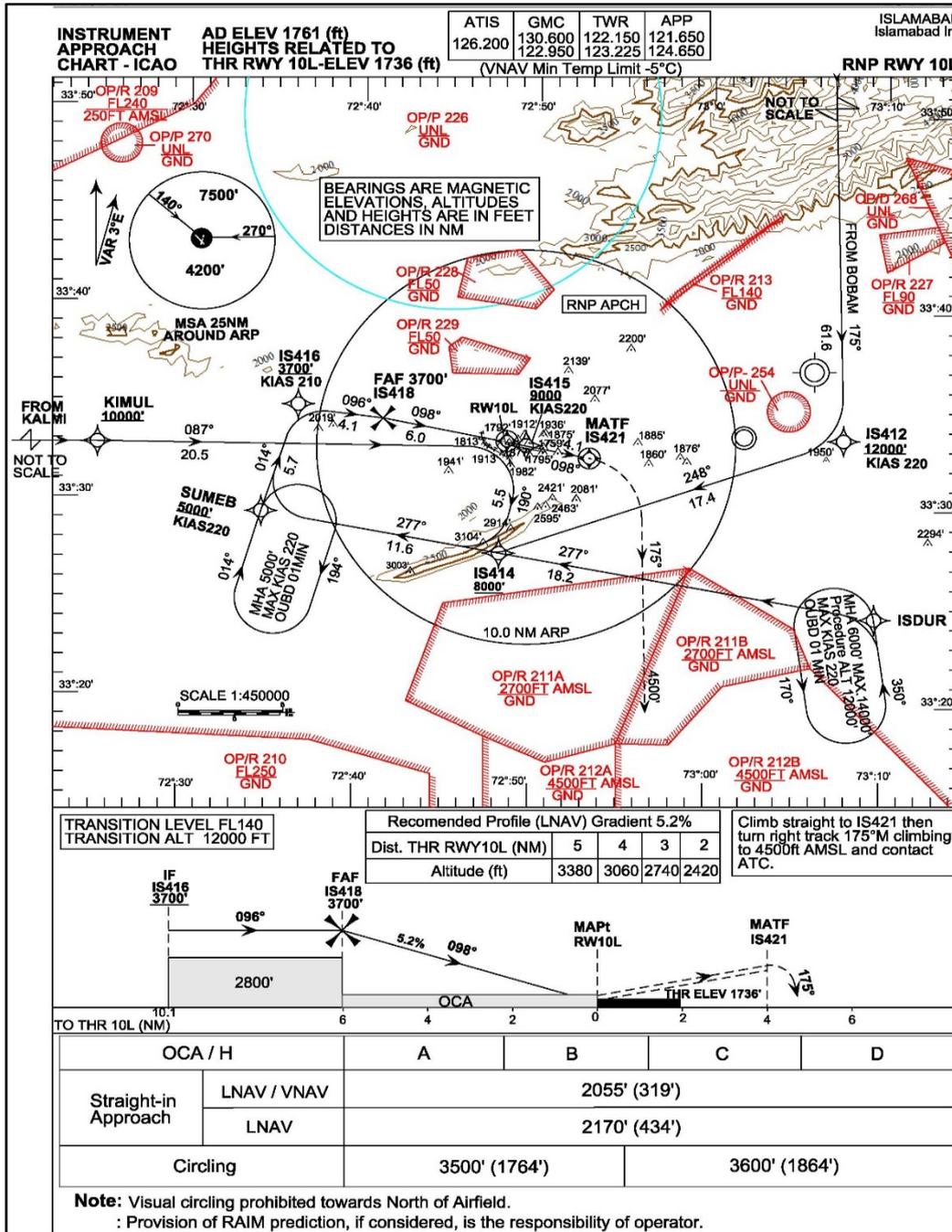


Figure 5 RNP Approach RW 10L OPIS, Islamabad

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	18	399	417	Nil
Total	18	399	417	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	
Age / Nationality / Gender	45 Years / Saudi / Male
License Type / Validity / Rating	ATPL / 25-07-2028
Flying Hours in past 24 hours	Nil "Day Off"
Type rated aircraft	A320, B-777

Table 2 Captain's Brief Description

First Officer (FO)	
Age / Nationality / Gender	32 Years / Saudi / Male
License Type / Validity / Rating	CPL / 07-06-2026
Flying Hours in past 24 hours	Nil "Day Off"
Type rated aircraft	A320, B-777

Table 3 FO's Brief Description

Approach Controller / Team Leader	
Date of Birth	04-05-1968
Type of License and Validity	ATCL / February, 2027
Class and Validity of Medical	Class III / 31-12-2024

Table 4 Approach Controller's Brief Description

Tower Controller	
Date of Birth	30-09-1993
Type of License and Validity	ATCL / August, 2028
Class and Validity of Medical	Class III / 31-12-2024

Table 5 Tower Controller's Brief Description

Area Controller	
Date of Birth	07-09-1987
Type of License and Validity	ATCL / May, 2028
Class and Validity of Medical	Class III / 31-12-2024

Table 6 Area Controller's Brief Description

METAR OPIS, Islamabad	
OPIS	Station ID: Islamabad International Airport (OPIS), Pakistan
140200Z	Day: 14 Time: 02:00 UTC (Date & Time)
23006KT	Wind Direction: 230°, Speed: 06 kt
6000	6000 m (Visibility in meters)
NSC	Cloud Layer: No Significant Clouds
19/14	19°C (Temperature) / 14°C (Dew point)
Q1014	Air pressure is 1014 hPa (Altimeter setting)
NOSIG	No significant weather changes expected

Table 9 METAR description OPIS, Islamabad at time 0200Z

1.8. Aids to Navigation

1.8.1. Navigational aids for OPIS, Islamabad 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 28R	IBIP	110.7 MHz	H24	333312.69N 0724812.32E	530.96 M	-
ILS/LOC CAT III 28L	IBBA	108.1 MHz	H24	333306.01N 0724810.82E	535.39 M	-
ILS/LOC CAT I 10R	IBAP	111.3 MHz	H24	333240.69N 0725052.37E	535.92 M	-
DVOR/DME (3°E/2017)	BTR	114.6 MHz CH93X	H24	333239.54N 0725121.84E	535.11M	Coverage 200 NM
GP/TDME 10R	IBAP	332.3 MHz CH50X	H24	333306.34N 0724834.23E	545.95M	3° RDH/TCH 50 FT
GP/TDME 28R	IBIP	330.2 MHz CH44X	H24	333254.84N 0725031.54E	549.50M	3° RDH/TCH 50 FT
GP/TDME 28L	IBBA	334.7 MHz CH18X	H24	333240.29N 0725029.68E	546.89M	3° RDH/TCH 50 FT

Table 10 Radio Navigation & Landing Aids OPIS, Islamabad

1.9. Communications

1.9.1. Communication frequencies for OPIS, Islamabad 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
Aerodrome Control Service	Islamabad Ground	124.350 MHZ	H24	Fire
Aerodrome Control Service	Islamabad Departure	118.550 MHZ	H24	Clearance Delivery
Aerodrome Control Service	GMC (N)	125.150 MHZ	H24	Secondary
Emergency Service	Islamabad	121.500 MHZ	H24	Function Emergency
Approach Control Service	Islamabad APP	124.650 MHZ	H24	Secondary
Military Frequency	Islamabad APP	241.200 MHZ	HX	Secondary
Aerodrome Control Service	GMC (N)	123.050 MHZ	H24	Primary
Aerodrome Control Service	Islamabad Tower	122.150 MHZ	H24	Primary
Approach Control Service	Islamabad APP	121.650 MHZ	H24	Primary
Aerodrome Control Service	Islamabad Ground	122.950 MHZ	H24	Secondary
Aerodrome Control Service	Islamabad Departure	119.650 MHZ	H24	Departure Frequency
Aerodrome Control Service	Islamabad Tower	123.225 MHZ	H24	Secondary
Military Frequency	Islamabad APP	240.500 MHZ	HX	Primary
Aerodrome Control Service	Islamabad Ground	121.850 MHZ	H24	Vehicle / Follow-Me
Aerodrome Control Service	Islamabad Ground	130.600 MHZ	H24	Primary
D-ATIS	D-ATIS	126.200 MHZ	H24	Weather Broadcast Service

Table 11 Communication Facilities, OPIS, Islamabad

1.10. Aerodrome Information

1.10.1. Aerodrome data of OPIS, Islamabad 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
10R	100.58°	3658 x 60	110/F/C/X/T ASPH Flexible	333304.28N 0724821.81E	THR 528.06 M / 1732.49 FT	0.12% UP
28L	280.60°	3658 x 60	110/F/C/X/T ASPH Flexible	333242.42N 0725041.37E	THR 532.53 M / 1747.14 FT	0.12% DOWN
10L	100.58°	3658 x 45	110/F/C/X/T ASPH Flexible	333310.98N 0724823.30E	THR 529.03 M / 1735.67 FT	0.12% UP
28R	280.60°	3658 x 45	110/F/C/X/T ASPH Flexible	333249.12N 0725042.87E	THR 533.41 M / 1750.04 FT	0.12% DOWN
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
NIL	1000 x 150	3778 x 300	168 x 150	NIL	NIL	Runway Shoulders: 7.5 m on each side of Both Rways
NIL	190 x 150	3778 x 300	168 x 150	NIL	NIL	NIL
NIL	1000 x 150	3778 x 300	260 x 150	NIL	NIL	NIL
NIL	1000 x 150	3778 x 300	168 x 150	NIL	NIL	NIL

Table 12. Aerodrome Information – RW Physical Characteristics OPIS, Islamabad

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. Not Applicable.

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 14 October, 2024, Saudi Arabian Airlines flight SVA-724, operated by a Boeing 777-368 ER, Registration No. HZ-AK21 was a scheduled commercial passenger flight, which took off from OERK, Riyadh, Saudi Arabia, to OPIS, Islamabad Pakistan.

2.1.2. The flight progressed uneventfully until its entry into Pakistani airspace. Communication and navigation systems on board were functioning normally, and weather conditions at the destination were stable and operationally favourable.

2.2. Flight Operations

2.2.1. SVA-724 took off from King Khalid International airport (OERK), Riyadh, Saudi Arabia and intended to land at Islamabad International Airport (OPIS), Islamabad, Pakistan.

2.2.2. Ground operations were all normal and aircraft departed Riyadh, Saudi Arabia at 2327Z.

2.2.3. **Incomplete ATC Clearance Read-Backs** – Upon initial contact with the Islamabad Area Control, **the pilots did not read-back the complete ATC clearance**, even when insisted by the Area Surveillance Controller. A similar behaviour can be observed in further co-ordinations during the initial descent and approach clearance phases; the crew read back only the routing (to SUMEB and IS416) but omitted mentioning “ILS Z Approach” and “RW 10R”.

2.2.4. **Crew Expectation Bias** – RT extracts indicate that the crew was so focused on the ATS route sequence that they discounted or “filtered out” the runway and approach type; consistent with expectation bias.

2.2.5. **Crew Resource Management (CRM) failure** – Neither pilot adequately attended to the full ATC clearances or challenged one another throughout the flight, resulting in repeated omissions. This mutual inattentiveness to ATC instructions and lack of inter-crew challenge represents a significant CRM discrepancy, as it removed critical cross-checking layers designed to catch and correct errors before they led to a wrong-runway landing.

2.2.6. **Hesitant Read-Back Suggesting Unchallenged Runway Misalignment** – When the Tower Controller issued clearance to land for RW 10R, the pilot’s read-back “RW 10...” was followed by a brief hesitation, while omitting the left/right RW designator. **This pause and omission implies that the crew might have recognized the aircraft’s alignment with the wrong runway, but still chose not to question the clearance.**

2.2.7. **Failure to Execute Go-Around under Runway Ambiguity** – Crew Resource Management (CRM) protocols mandate that a **go-around be initiated whenever there is any doubt about runway alignment or landing clearance during the final approach.** In this incident, despite recognizing ambiguity the flight crew continued the descent and touchdown. By not executing a go-around, the pilots

bypassed a primary safety barrier designed to prevent runway incursions and misidentification. This deviation from standard CRM procedure eliminated the opportunity to re-establish situational awareness, re-verify the assigned runway, and conduct a stabilized approach. A timely go-around would have allowed the crew to climb to a safe altitude, confirm the correct runway alignment with ATC, and re-attempt the approach under clear, verified conditions.

2.3. Weather

2.3.1. The reported weather conditions⁴ over Islamabad at 020000 indicate a stable and benign meteorological environment with light south-westerly winds at 06 knots. Visibility of 6,000 meters and the absence of significant cloud cover (NSC) indicate unobstructed flight paths and no ceiling limitations. A temperature of 19°C with a dew point of 14°C reflects moderate humidity which was reported 73% at that time, reducing the likelihood of fog or condensation-related issues. Overall, the conditions were favourable and posed no operational or safety concerns.

2.4. Air Traffic Control

2.4.1. Area Control (Islamabad ACC)

2.4.1.1. **Incomplete Read-Back Follow-Up** – Although the controller repeated the full clearance after the first incomplete read-back (020407), there was no subsequent challenge to ensure a correct read-back the second time, despite the crew omitting the “ILS Z Approach” and “Runway 10R” elements in their second read-back. Transmissions focused heavily on waypoint sequencing (SUMEB, IS416), but **the controller did not reinforce or highlight the runway and approach portion of the clearance when the crew fixated on fixes alone.**

2.4.2. Approach Control (Islamabad Approach)

2.4.2.1. **Lack of Read-Back Enforcement on Reissued ILS 10R Clearance** – At 021828, Islamabad Approach reissued the identical ILS Z 10R clearance **but did not insist on a full, correct read-back.** The pilot again replied only with routing (SUMEB and IS416). Controller accepted the partial read-back without requiring the crew to confirm the critical approach / RW elements.

2.4.2.2. **Ambiguous “Report Established” Call** – The controller instructed to “*report established*” at 022429, but did not follow up on the content of that report. A proper ATC Clearance should have reiterated “**ILS Z Approach Runway 10 Right**” at that point.

2.4.2.3. **Altimeter Setting Read-Back** – When *QNH 1015* was passed at 022607, the crew’s read-back was not clear, yet the Approach Controller did not prompt for clarity or confirmation.

⁴ PMD METAR, Islamabad

2.4.2.4. **Omission of Runway Side Designator** – In the last approach-control transmission, the controller specified the track miles from RW “10” without specifying “Left” or “Right,” thereby omitting the crucial runway-side qualifier.

2.4.2.5. **Aircraft Flight-path monitoring** – As per the Job Description (CAAF-031-HRBS-1.0) of Approach Controller (Radar) at OPIS, Islamabad, the Approach Controller is responsible to **“monitor the traffic to be in compliance with ATC Clearance and be aware of any possible abnormal situation”**, as well as to **“provide radar monitoring service to all aircraft operating within the area of responsibility and the traffic on the final approach till landing”**. In this incident, the Approach Controller **failed to detect SVA-724’s deviation** from the cleared ILS Z approach RW 10R, thereby not providing the required monitoring service.

2.4.3. Tower Control (Islamabad Tower)

2.4.3.1. **Ambiguous Read-Back Accepted** – At 022641, Tower Controller issued landing clearance stating **“Clear to land Runway 10R”**, yet **accepted the pilot’s truncated read-back “Runway 10”** without querying **“Left or Right”**, hence failing to challenge an ambiguous read-back directly; enabling the aircraft to continue aligning with RW 10L.

2.4.3.2. **Failure to Issue Go-Around Clearance** – Even when the Tower Controller **recognized that the aircraft was aligned with the wrong RW, the controller hesitated to issue a Go-Around**. By failing to do so, the controller allowed the aircraft to continue its approach unchecked, significantly increasing the potential for a runway incursion or collision.

2.5 Organizational Factors

2.5.1 PAA

2.5.1.1 **Dual Supervisory and Operational Roles** – The assignment of both Supervisory duties and Approach Control responsibilities to the same individual increased workload and reduced opportunities for independent oversight. With no separate supervisor to crosscheck clearances or relieve the controller during peak traffic periods, critical read-back omissions and procedural lapses become more likely to go unnoticed.

2.5.1.2 **Instruction to Go-Around** – Although landing is a critical phase, PCAA Air Safety Circular (ASC-003-ARAN-2.0) Unstable Approaches Air Traffic Control Consideration, explicitly requires ATC to advise the aircraft to consider executing a missed approach **“if the position or identification of the aircraft is in doubt during any portion of the final approach”**. Despite official instructions, the controller was still hesitant to issue Go-Around clearance to the aircraft even when the position of the aircraft was observed to the left of track, showing lack of confidence and decision making.

SECTION 3 – FINDINGS

3.1. Findings

- 3.1.1. SVA-724 was a scheduled commercial passenger flight from OERK Riyadh, Saudi Arabia to OPIS, Islamabad, Pakistan.
- 3.1.2. Aircraft was airworthy and operated by a qualified flight crew. No technical issues and abnormalities were reported prior to or during the approach and landing phase.
- 3.1.3. No significant weather was reported over OPIS, Islamabad as well as surrounding areas at the time of the incident.
- 3.1.4. The flight proceeded uneventfully until the final stages of approach, maintaining appropriate communication with Islamabad Area Control and Islamabad Approach.
- 3.1.5. SVA-724 was cleared exclusively for ILS Z Approach to RW 10R but landed on RW 10L.
- 3.1.6. **SVA-724 did not read back the exact clearance given by ATC Controllers during various phases of flight.**
- 3.1.7. **Despite incomplete pilot read-backs throughout the flight, the controllers did not challenge the pilot.**
- 3.1.8. Flight crew misinterpreted the approach clearance and aligned with RW 10L instead of RW 10R.
- 3.1.9. **The flight path of the aircraft was not monitored by the Approach Controller** during the final approach phase.
- 3.1.10. **Tower Controller visually observed the misalignment but did not issue a correction to the aircraft** during the critical phase of landing. (As depicted in Tower Controller's statement).
- 3.1.11. **The crew reported receiving clearance for an RNP Approach RW 10L**, which is not supported by ATC recordings.
- 3.1.12. **Captain's post landing statement suggests confusion** regarding clearance type (ILS vs RNP).
- 3.1.13. As per R/T extracts and Controllers statements, during all phases of flight, **SVA-724 was cleared for ILS Z Approach RW 10R only.**
- 3.1.14. ATC procedures were followed correctly, and instructions were clear, consistent, and compliant with standard operating procedures except monitoring of readback.
- 3.1.15. **The crew's situational awareness and verification procedures appear to have been inadequate, resulting in misidentification of the correct landing RW** despite receiving correct ATC instructions.
- 3.1.16. No operational traffic was affected and no damage or injuries were reported.

3.2. Cause / Contributory Factors

3.2.1. Cause

3.2.1.1. The flight crew's incorrect interpretation and insufficient adherence to ATC instructions led to landing on the wrong runway.

3.2.2. Contributory Factors

3.2.2.1. Inadequate cross-verification and monitoring within the flight crew regarding ATC clearances and navigational alignment.

3.2.2.2. Air traffic controllers did not adequately monitor the crew's read-backs of landing clearances and failed to prompt for correction when omissions occurred.

3.2.2.3. Approach Controller missed earlier signs of misalignment during the approach phase, which could have allowed for timely corrective action.

3.2.2.4. The Tower Controller issued appropriate clearances and followed standard protocols but lacked real-time corrective intervention.

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 –

Approaches or landings to/on unassigned runways or to/at the wrong aerodromes.

SECTION 4 – SAFETY RECOMMENDATIONS

4.1. Safety Recommendations

4.1.1. Saudi Arabian Airlines

4.1.1.1. Introduce Flight Crew Training programs reinforcing correct interpretation and adherence to ATC clearances, appropriate selection and execution of approach procedures, and accurate identification of RW using both navigational aids and visual cues.

4.1.1.2. Crew Resource Management (CRM) protocols should be followed; prioritizing active cross-checks between flight crew, especially during approach and landing, while ensuring assertive communication to promptly address any discrepancies.

4.1.1.3. Recurrent simulator training programs should be conducted to strengthen pilot situational awareness, ensure adherence to RW alignment protocols, and improve responses to navigational errors.

4.1.1.4. **A formal internal safety review process may be established to systematically assess operational deviations and proactively mitigate recurrence through procedural enhancements and trainings.**

4.1.2. PAA (Pakistan Airports Authority)

4.1.2.1. Aligned with PCAA ASC-005-ARAN-1.0 (Importance of Read Back of ATC Clearance and other Safety Related Instructions), requirement for controllers to verify and correct any discrepancies in safety-critical read-backs, PAA should mandate focused training and regular simulator checks to ensure controllers promptly challenge incomplete or incorrect read-backs and thereby reinforce this vital safety barrier.

4.1.2.2. Mandatory refresher training of involved ATCOs on assertive communication and decision-making during critical phases.

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

4.1.2.4. Implement and ensure proper use of advanced runway alignment monitoring systems that alert controllers of potential misalignments in real time.

4.1.2.5. Enhance ATC training, emphasizing on proactive identification of ATC clearance deviations, especially during approach and landing phases, including visual and radar-based monitoring.

4.1.2.6. PAA may issue an advisory or safety bulletin, highlighting the importance of RW confirmation and verification during approach and landing, particularly in multi-RW environments.

4.1.2.7. **Ensure that independent supervisory positions are established at ATC units for continuous monitoring, thereby reducing the likelihood of read-back omissions and procedural lapses.**

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