
# GOVERNMENT OF INDIA

## CIVIL AVIATION DEPARTMENT

## DIRECTORATE GENERAL OF CIVIL AVIATION

## FINAL INVESTIGATION REPORT

**Ground Incident involving M/S Air India Express Airbus A320N aircraft VT-ATJ at Surat Airport On 13th March 2024**

**Office of Director Air Safety (WR)**
**Integrated Operational Office Complex, Ville Parle (E)**
**Mumbai – 400099**

## FOREWARD

This document has been prepared based upon the evidence collected during the investigation, opinion obtained from the experts and laboratory examination of various components. The investigation has been carried out in accordance with Rule 13(1) of the Aircraft (Investigation of Accidents and Incidents) Rules, 2017.

The investigation is conducted not to apportion blame or to assess individual or collective responsibility. The sole objective is to draw lessons from this incident which may help to prevent such future incidents.

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## LIST OF ABBREVIATIONS USED IN THIS REPORT

| | |
|---|---|
| AD | Airworthiness Directive |
| AME | Aircraft Maintenance Engineer |
| AMM | Aircraft Maintenance Manual |
| A/P | Auto Pilot |
| APD | Airport Director |
| ATC | Air Traffic Controller |
| ATS | Air Traffic Services |
| ATPL | Airline transport pilot licence |
| CAR | Civil Aviation Requirements |
| CAMO | Continuing Airworthiness Management Organization |
| CCTV | Closed Circuit Television |
| CVR | Cockpit Voice Recorder |
| DGCA | Directorate General of Civil Aviation (India) |
| FDR | Flight Data Recorder |
| FO | First Officer |
| Hrs. | Hours (in time) |
| IIC | an Investigation-in-Charge IIC |
| IR Rating | Instrument Rating |
| lb | Pounds |
| IST | Indian Standard Time |
| LH | Left Hand side |
| MEL | Minimum Equipment List |
| METAR | Meteorological Aerodrome Report |
| NOTAM | Notice to Airmen |
| PIC | Pilot In-Command |
| PTT | Parallel Taxi Track |
| RWY | Runway |
| RH | Right Hand side |
| SB | Service Bulletin |
| SCARS | Safety Case Assessment and Reporting System |
| WIP | Work In Progress |
| TWY | Taxiway |
| UTC | Coordinated Universal Time |

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**FINAL INVESTIGATION REPORT ON GROUND INCIDENT INVOLVING M/s AIR INDIA EXPRESS AIRBUS A320N AIRCRAFT VT-ATJ**

**AT SURAT AIRPORT ON 13th March 2024**

| | | | |
|---|---|---|---|
| **1.** | **Aircraft** | **Type** | Airbus A320-251N |
| **2.** | | **Nationality** | Indian |
| **3.** | | **Registration** | VT-ATJ |
| **4.** | **Owner** | | CELESTIAL AVIATION TRADING 14 LIMITED, IRELAND |
| **5.** | **Operator** | | Air India Express, India |
| **6.** | **Pilot In- Command** | | ATPL holder |
| **7.** | **Co-Pilot** | | CPL holder |
| **8.** | **Extent of Injuries** | | Nil |
| **9.** | **Date and Time of Incident** | | 13/03/2024, 16:58 Hrs. UTC approx. |
| **10.** | **Place of Incident** | | Surat Airport |
| **11.** | **Geographical location of site of Occurrence** | | 21° 7'12.87"N 72°44'41.23"E |
| **12.** | **Last point of Departure** | | Sharjah International Airport (OMSJ) |
| **13.** | **Intended Place of Landing** | | Surat Airport (VASU) |
| **14.** | **No. of Personnel On-Board** | | 54 |
| **15.** | **Type of Operation** | | Scheduled Revenue Flight |
| **16.** | **Phase of Operation** | | Taxiing |
| **17.** | **Type of Incident** | | Ground Collision (GCOL) |

(All timings in the report are in UTC unless or otherwise specified)

## SYNOPSIS

On 13.03.2024, M/s Air India Express A320-251N aircraft, bearing registration VT-ATJ, was scheduled to operate sectors Mumbai – Sharjah – Surat. After an uneventful first sector, the aircraft departed from Sharjah for Surat as flight AXB172

Construction of apron extension and parallel taxi track was undergoing at Surat Airport.

After landing at Surat Airport, while taxiing to the gate through apron taxiway, crew followed the greyed-out old apron taxiway instead of the new apron taxiway. During this taxiing process, the left-hand wing of the aircraft collided with a construction dump truck which was involved in construction activities. The aircraft continued to taxi and docked at the bay. There was no injury to the crew and the passengers.

The Director General of Civil Aviation instituted an investigation into the incident and appointed an Investigation-in-Charge and a member to investigate into the cause of the incident vide Order No. DGCA-15024/4/2024-DAS dated 28/03/2024 under Rule 13(1) of The Aircraft (Investigation of Accidents and Incidents) Rules 2017.

The cause of the incident is the failure of the crew to correctly identify the operational apron taxiway and following the non-operational apron taxiway and failure to take cognizance of the obstacles near the apron edge line.

Lack of taxiway closure marking on the old apron taxiway, improper obliteration of old apron taxiway marking and the improper mitigating actions during safety risk assessment by the aerodrome operator were identified as the contributory factors.

## 1. FACTUAL INFORMATION

### 1.1. History of the flight

Construction of parallel taxi-track and the extension of the Apron between Taxiway A and Taxiway B were underway at Surat Airport. The construction works were being carried out by a contracted agency under the supervision of the aerodrome officials. Dump trucks, pavers and rollers were used for the same at a distance of 3.5 m from the apron pavement edge.

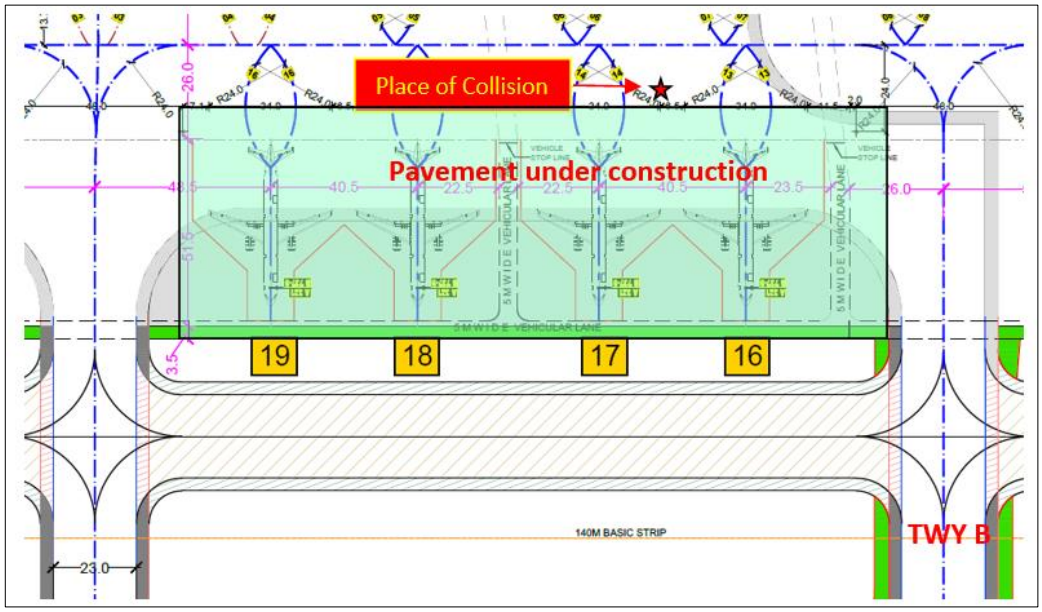



Fig.1: Place of collision and the under-construction pavement depicted in the approved apron proposed marking layout chart

On 13.03.2024, an Airbus A320-251N belonging to M/s Air India Express, bearing registration VT-ATJ, operated a scheduled commercial flight from Sharjah to Surat as flight AXB172. This was the second sector of the day for the aircraft, as well as, for the crew (Mumbai – Sharjah – Surat). The first sector was operated uneventfully.

For the second sector, the climb, cruise and descend were uneventful. The aircraft landed safely on Runway 22 of Surat Airport at 16:52:48 UTC. After the touchdown, ATC instructed “BACKTRACK RWY 22 USING TURNPAD, VACATE VIA B, STAND 8”. The First Officer replied “VACATE VIA TURNPAD, BRAVO STAND 8”. PIC was the Pilor Flying (PF) and FO was the Pilot Monitoring (PM). The winds were calm.


Fig. 2: Depiction of bifurcation of apron taxiway and AXB172 following old apron taxiway

The crew clarified with the ATC about the turnpad on RWY 22 and started backtracking. ENG#2 was shut down during the backtracking. FO informed PIC that the construction works are in progress for expanding the apron and TWY A is closed for the material supply.

The aircraft took a left turn on a non-operational (greyed-out) old apron taxiway, which is 9m away from the apron pavement edge.

As they were taxiing on the wrong apron taxiway and were trying to identify the stand, the aircraft LH wing hit the bed of the construction dump truck. The FO reacted initially saying something had hit to which the PIC replied 'nothing has hit' and 'its all okay'. The aircraft was halted for 8 seconds and in the meantime, FO identified stand#8.

After PIC said its clear from the left side, the FO identified the taxiway they were on, had its markings removed. As the aircraft was taking turn for joining lead-in line for Stand#8, the FO identified that they were not on a taxiway and had shown PIC the actual taxiway.

After docking, the AME informed the crew that LH wing #5 slat was damaged. Nobody was injured in this incident. The incident took place at night.

## 1.2. Injuries to persons

| Injuries | Crew | Passengers | Others |
|---|---|---|---|
| Fatal | Nil | Nil | Nil |
| Serious | Nil | Nil | Nil |
| Minor/None | Nil/06 | Nil/48 | |

## 1.3. Damage to aircraft

The collision of LH wing of the aircraft with the extended bed of the construction dump truck resulted in damage to slat#5 of Left-Hand side wing leading edge.


Fig.3: Damage to Slat#5 of LH wing

## 1.4. Other damage

Nil

## 1.5. Personnel information

| Details | Pilot in-command | First Officer |
|---|---|---|
| Age | 35 | 26 |
| License | DGCA ATPL | DGCA CPL |
| Date of Initial Issue | 20/4/2017 | 11/1/2019 |
| Valid up to | 26/02/2028 | 10/1/2034 |
| Category | Aeroplane | Aeroplane |
| Date of Class I Med. Exam | 14/11/2023 | 5/10/2023 |
| Class I Medical Valid up to | 13/11/2024 | 6/10/2024 |
| Date of issue FRTO License | 23/10/2007 | 11/1/2019 |
| FRTO License valid upto | 2/2/2026 | 2/12/2077 |
| Endorsements as PIC/FO | PIC: C-172, PA-34, A320 | PIC: C172,PA-34<br>FO: A320 |
| Total flying experience | 5060:05 Hrs | 921Hrs |
| Total flying experience on type | 1849:35 Hrs | 700 Hrs |
| Last Flown on type | 13/03/2024 | 13/03/2024 |
| Total flying experience in the last 1 year | 250:09Hrs | 283 Hrs |
| Total flying experience in the last 6 months | 195:54Hrs | 246:25 Hrs |
| Total flying experience in the last 30 days | 47:16Hrs | 47:12Hrs |
| Total flying experience in the last 7 days | 11:49Hrs | 17:11Hrs |
| Total flying experience in the last 24 hrs | 05:45Hrs | 05:45Hrs |
| Rest before the incident flight | 29Hrs | 55:25Hrs |
| Any Past incident of the crew | NIL | NIL |

Prior to operating their first sortie of the day at Mumbai, both crew members had undergone BA test and the results were negative.

## 1.6. Aircraft information

| | |
|---|---|
| Aircraft Model | Airbus A320-251N |
| Minimum crew required | 02 |
| Aircraft S. No. | 10520 |
| Year of Manufacturer | 2021 |
| C of R | No: 5373/3, Valid |

| | |
|---|---|
| C of A | No: 7467/2, Valid |
| Category | NORMAL |
| A R C issued on | 11-10-2023 |
| ARC valid up to | 12-10-2024 |
| Aircraft Empty Weight | 43332 kg |
| Maximum Takeoff weight | 75500 KG |
| Date of Aircraft weighment | 29-08-2023 |
| Empty Weight | 43332 kg |
| Max Usable Fuel | 18623 kg |
| Max Payload with full fuel | 12633 kg |
| Empty Weight C.G | 26.761 % MAC |
| Next Weighing due | 08-06-2026 |
| Total Aircraft Hours/Cycles | 9356:18 FH/5231 FC |
| Last major inspection | E05 (26-02-2024) |
| Last Inspection | Transit Inspection |
| Engine Type | LEAP-1A26 |
| Date of Manufacture LH | 29 April 2021 |
| Engine Sl. No.LH | 59A326 |
| Last major inspection(LH) | First Run |
| Total Engine Hours/Cycles LH | 9356:18 / 5231 |
| Date of Manufacture RH | 30 April 2021 |
| Engine Sl. No.RH | 59A325 |
| Last major inspection(RH) | First Run |
| Total Engine Hours/Cycles RH | 9356:18 / 5231 |
| Aeromobile License | STPWRRLO040120230804140 |
| AD, SB, Modification complied | Complied |

All the concerned AD, mandatory SBs, and DGCA mandatory modifications on this aircraft and its engine were complied with as of date of the incident.

There were no reported defects/snags related to the nose wheel steering/flight controls/windshield/lights. There was no active MEL for the flight.

The ARC of the aircraft was valid till 12.10.2024. The last major maintenance was E05 (5000 FH/FC or 30 months, whichever is earlier) check on 26.02.2024 by AIX connect, DGCA approved maintenance facility at Bangalore when the aircraft accumulated 9171:35 Flight Hours (FH) and 5159 Flight Cycles (FC).

Before the operation of the incident flight, the certifying staff had carried out the transit check at Sharjah and thereafter the aircraft was certified for service.

## 1.7. Meteorological information:

METAR is issued every half hour at Surat Airport. As the incident happened at around 16:59 UTC on 13.03.2024, the METAR information of 1700 UTC is taken for investigation. The following are the meteorological conditions.

- Wind: 270 deg at 04 KT
- Visibility: 6000 meters
- Clouds: No Significant Clouds
- Temperature: 24 degrees Celsius
- Dew point: 20 degrees Celsius
- QNH: 1014 hPa
- No significant weather

## 1.8. Aids to navigation

All navigation aids were working normally.

## 1.9. Communications

Two-way communication was always available between the aircraft and the Surat Tower on frequency 118.550 Mhz. The relevant portion of the R/T communication is reproduced below.

| TIME | FROM | TO | CONVERSATION |
|---|---|---|---|
| 16:49:11 | AXB172 | TOWER | ON ILS RWY 22 |
| | TOWER | AXB172 | RWY 22 CLEARED TO LAND WIND 250 DEG 04 KT |
| | AXB172 | TOWER | RWY 22 CLEARED TO LAND |
| 16:53:42 | TOWER | AXB172 | LANDED 53, BACKTRACK RWY 22 USING TURN PAD, VACATE RWY VIA TXY WAY B, STAND NO 08 |
| | AXB172 | TOWER | VACATE VIA TURN PAD B STAND NO 08 |
| 16:54:16 | AXB172 | TOWER | UNABLE TURN PAD WILL TAKE FULL LENGTH AND TURN PAD |
| | TOWER | AXB172 | USE TURN PAD AT THE END OF RWY |
| 16:55:23 | TOWER | AXB172 | CONFIRM REGISTRATION VTATJ |
| | AXB172 | TOWER | THAT'S AFFIRM |
| | TOWER | AXB172 | ROGER |
| 16:57:59 | TOWER | AXB172 | VACATE RWY VIA B, STAND NO 08 |

| | | | |
|---|---|---|---|
| | AXB172 | TOWER | VACATE RWY VIA B, STAND NO 08 |

After the aircraft was docked at the bay, the station manager of Air India Express at Surat, informed the ATC about the incident through fixed-line telephone.

## 1.10.Aerodrome information

Surat Airport (IATA: STV, ICAO: VASU) is an international airport located in Magdalla, Surat, operated by the Airports Authority of India under license No. AL/PUBLIC/058. The license was last issued on 01.11.2019. The aerodrome reference code is 4C.

The orientation of RWY 04/22 having a course of 043 and 222 degrees respectively. The aerodrome elevation is 29 ft and the aerodrome reference temperature is 42 deg C. The airport is equipped with Navigational aids like ILS, DME, VOR etc. The airport has a firefighting category of 7.

The RWY 22 threshold is displaced by 616 m. The declared distances for RWY are as under:

| RWY Designation | Elevation | TORA(M) | TODA(M) | ASDA(M) | LDA (M) |
|---|---|---|---|---|---|
| 04 | 23 ft | 2990 | 2990 | 2990 | 2906 |
| 22 | 24ft | 2906 | 2906 | 2906 | 2290 |

### 1.10.1.Construction of PTT and Expansion of Apron

#### 1.10.1.1. Safety Assessment

The construction work was started after obtaining in-principal approval from DGCA and carrying out the SCARS for the same i.a.w. Aerodrome Advisory Circular (AD AC) 01 of 2012. As part of the safety assessment, the hazards due to the changes in apron layout were identified and one of the hazards identified was the confusion to the pilots due to the change in apron layout. Moderate risk was assigned to the hazard with ‘Aircraft Incident’ as a consequence of changes in the apron layout.

The existing controls indicated the following.

1.Provision of information signage and marking will be provided.

2.Taxiway light will be available

3.AIP Publication and NOTAM Action

4.Training Program for Familiarization of Operational Area and related rules to stakeholder

Based on effect on safe operations within existing controls, the hazard was assigned a rating ‘Low’ rating. The overall safety magnitude of project/change was concluded as ‘Minor’.

No taxiway lighting was given to the new apron taxiway although it has been mentioned in the existing control. Although the discussion included ‘Aircraft Incident’ as a consequence, the complete obliteration of the previous apron taxiway pavement marking was not discussed. Further, the status/reflectivity of the changes made to the markings/paintings during the night under the apron mast lights were not taken care of.

#### 1.10.1.2. Construction Vehicle

As per the SOP for the construction of PTT and Expansion of Apron issued by the APD, Surat, the hours of work in the RWY strip/ Taxi strip shall be carried out in non-ATS watch hours (under suitable NOTAM), whereas work beyond RWY strip shall be carried out 24 hrs. under proper supervision. At the time of the incident, the construction was on progress during the ATS watch hours however was outside of the RWY/TWY strip.

As per the work diary, WMM (Wet Mix Macadam) top layer was in progress on 13.03.2024. As per the record 04 unskilled labourers were part of the construction work. The dump truck (TIPPER) and the paver used for the construction had a temporary vehicle permit to operate in the operational area. The drivers who were operating the vehicles also had a temporary pass and ADP.

The construction was ongoing, 3.5 m away from the apron pavement edge. The apron pavement is at a height of 0.75m from the ground level.

Fig.4: The construction dump truck and the scratch due to the collision

Except for a scratch at the area in which the LH wing leading edge of the aircraft hit, no damage was observed on the construction dump truck. The height from the scratch to the ground level, when the bed is extended, is 4.65m. Hence, the height of

the vehicle above the apron PQC (Pavement Quality Concrete) pavement level is 3.90m.

### 1.10.2.Non-compliance to the CAR by the aerodrome operator

#### 1.10.2.1.Lack of closure marking of apron taxiway

As per approved project, a new apron taxiway was provided approx. 115 ft away parallel and to the old apron taxiway ensuring a taxiway strip of 26 m (for Code C).

The aerodrome operator had greyed out the entire old apron taxiway and the new apron taxiway was painted from a point 358 ft from the runway holding point. However, apart from painting the old apron taxiway with grey/black paint, no other measures were taken to declare the apron taxiway unserviceable. Further, all the previous markings related to the stand on the old apron taxiway were also painted out with grey/black paint.

As per Para 7.1.1 of CAR Section 4 Series B Part 1, “A closed marking shall be displayed on a runway or taxiway, or portion thereof, which is permanently closed to the use of all aircraft.” The CAR also mentions “on a taxiway a closed marking shall be placed at least at each end of the taxiway or portion thereof closed.”

The closure marking shall be yellow when displayed on a taxiway as per the CAR. Although the regulation mandates closed marking for closure taxiways, the same was not complied with by the aerodrome operator. As per the CAR, the following marking must have been placed/painted at the taxiway.

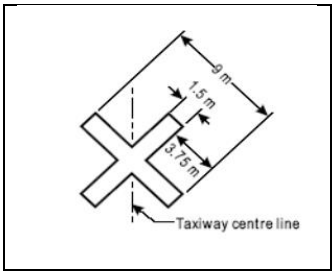
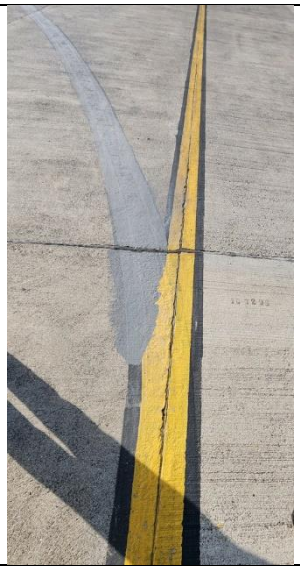
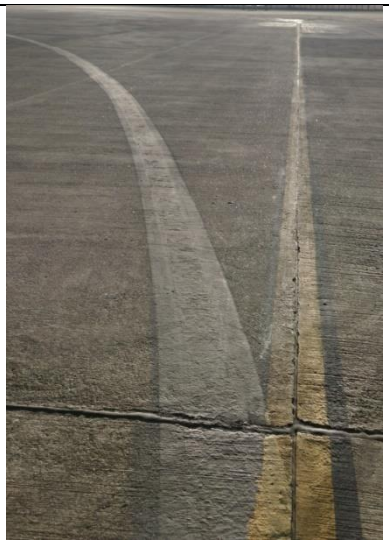



Fig. 5: Closed taxiway marking as per CAR

#### 1.10.2.2. Lack of usage of reflective materials for apron markings

The new apron taxiway line was painted using regular water-based paint without any reflective materials. Para 5.2.1.7 of CAR Section 4 Series B Part 1 states “At aerodromes where operations take place at night, pavement markings should be made with reflective materials designed to enhance the visibility of the markings.”

During, the site investigation the next day after the incident with same meteorological conditions, the apron inspection was carried out at around 17:00 local time and at around 23:45 local time. The following are the pictures which were taken at approx. 5 ft above the apron elevation.

| | |
|---|---|
|  |  |
| Fig. 6(a): Bifurcation point at day time | Fig. 6(b): Bifurcation point at night time |

To understand the crew perception during nigh ttime, with similar meteorological conditions which were prevalent at the time of incident, an inspection was carried out using a 10 ft step ladder. The following is the image taken from approx. 16 ft above the apron elevation.

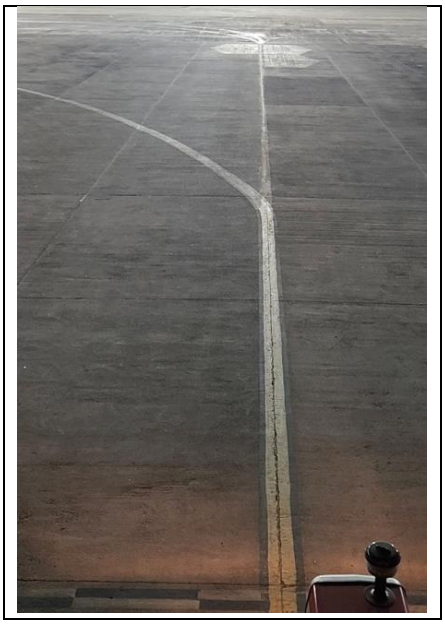


Fig.7: Image of bifurcation of apron taxiways at approx. 16 ft above apron elevation. (at night time)

The actual (new) apron taxiway was last painted in the third week of February 2024. The actual taxiway would only be clear once the person is approx. 6 ft short of the bifurcation point.

To address the issue of confusing markings on the apron, after the incident, observations were raised by O/o DAS-WR for lack of reflective materials for markings

and lack of conspicuous apron visual markings. Appropriate corrective actions were taken by the aerodrome operator. Currently, the apron taxiway centre line markings are made using reflective materials.

#### 1.10.2.3. Lack of Equally Spaced Apron Taxiway Edge Lights

At the time of the incident, only one taxiway edge light was available at the apron edge between TWY A and TWY B. This implies that the taxiway edge lights were not placed at a distance as required by the regulation on the straight section, which is approx. 150m.

Fig.8: One taxiway edge light at the time of incident and vehicles not having object flags

Para 5.3.18.3 of CAR Section 4 Series B Part 1 states “taxiway edge lights on a straight section of a taxiway and on a runway forming part of a standard taxi-route shall be spaced at uniform longitudinal intervals of not more than 60 m. The lights on a curve shall be spaced at intervals less than 60 m so that a clear indication of the curve is provided.”

In a total of three dual light (blue and red) housings were taken from construction at Apron A and were placed at the apron edge of Apron C construction, after the incident. All AGLs were serviceable as per the records maintained by the Electrical Department.

#### 1.10.2.4. Lack of adequate marking/lighting of objects

Para 6.2.2. of CAR Section 4 Series B Part 1 states “all mobile objects to be marked shall be coloured or display flags and Para 6.2.2.3 states “flags used to mark mobile objects shall be displayed around, on top of, or around the highest edge of, the object. Flags shall not increase the hazard presented by the object they mark.”

The dump truck, paver and roller which were used for the construction work, being movable objects, did not have the flags required by the CAR at the time of the incident (Ref. Fig 8).

Further, the involved dump truck had flashing yellow lighting on the top of the vehicle as required by the CAR. However, the same would be invisible from behind when the bed of the dump truck is extended.

### 1.10.3.NOTAMs indicating the WIP

'C' series NOTAMs were promulgated to alert the pilots of the construction progressing for apron expansion and construction of PTT and hence, to exercise caution. The following were the NOTAMs which were valid at the time of the incident.

**C0201/24**
2402240200 / 2403312359EST
WIP FOR CONSTRUCTION OF LINK TAXI CONNECTING PTT TO RWY-04 BEGINNING BEYOND ATC WATCH HOURS, PILOTS TO EXERCISE CAUTION WHILE LANDING, TAKEOFF AND TAXING

**C0226/24**
2402291530 / 2403310730
1530-0730
TWY A NOT AVBL DUE CONST OF APRON C AND PTT BTN TWY A AND TWY B

**C0263/24**
2403111230 / 2403312359 EST
SHOULDER OF TWY D NOT AVBL DUE CONSTRUCTION OF PTT. PILOTS TO EXER CTN WHILE TAXING VIA TWY D

**C0255/24**
2403090430 / 2404152359 EST
TWY C NOT AVBL DUE CONSTRUCTION OF PTT ACROSS THE TWY C.

### 1.10.4. Apron Lighting

The apron area, where the collision occurred, was adequately lit, and both the construction vehicles and the apron area were visible. This was verified during the on-site investigation and also from the CCTV footage (Ref. Fig. 7). The luminance of this area exceeds 85 lux, as per the latest lux report.

### 1.11.Flight recorders

The data from Solid State Flight Data Recorder and Cockpit voice recorder were downloaded and available for investigation.

### 1.11.1.Flight Data Recorder (FDR)

- As per the FDR data, the aircraft had established on ILS at 16:48:38 UTC while they were 3000 ft on QNH. Both A/P 1 & 2 and A/THR were being engaged with both the FDs on. The aircraft was maintaining a speed of approx. 129 kts IAS. A stabilised approach was being made with the parameters within the limit. At 16:51:46 UTC, the A/P was disengaged when the aircraft was at 631 ft RA. At 16:52:48 UTC, the aircraft landed safely at RWY 22.
- The aircraft took a 180-degree turn at the turnpad at the end of the runway and started backtracking. The slats were brought to a fully retracted position at 16:55:23 UTC. As the aircraft reached 2329 ft short of TWY B, ENG#2 was shut down.

- At approx. 16:58:47 UTC, the crew took a left turn on non-operational (greyed-out) old apron taxiway and was taxiing at a ground speed of 15 kts.
- At around. 16:59:21 UTC, the brakes were applied and the ground speed reduced to 2 kts. A considerable increase in lateral acceleration (up to 0.031g) was observed.
- After 8 seconds, at 16:59:30 UTC, the brakes were released and the aircraft started moving.

### 1.11.2.Cockpit Voice Recorder (CVR)

The CVR readout was obtained and the same has been corroborated with the DFDR. The PIC was the PF while taxiing and FO was the PM. The relevant portion of the same has been transcribed below.

At 16:56:21 UTC, while backtracking, ENG#2 was shut down, the crew discussed TWY A being closed while taxiing towards TWY B. At 16:57:25 UTC, ATC again instructed to vacate via B, stand 8 which was readback.
Thereafter, the FO informs the PIC about the apron expansion work at night time and TWY A being closed due to the same for material supply.
While taxiing on the non-operational old apron taxiway, no comments were made by either of the crew.
The crew were identifying the stands and then the collision was heard. The FO made ‘ah, lag gya kya’ to which the PIC replied its all fine. The crew continued taxi and while taking turn for Stand 8, the FO identified and informed the PIC that they were not on taxiway. He then showed the operational taxiway to the PIC.

## 1.12. Wreckage and impact information.

Not applicable

## 1.13. Medical and pathological information.

Both the crew had undergone Pre-flight Breath Analyser test before start of their Flight Duty period and were found negative.

## 1.14. Fire.

There was no fire before or after the incident.

## 1.15. Survival aspects

No human injuries were reported in the incident. The incident was survivable.

## 1.16. Tests and research

Not applicable.

### 1.17. Organizational and management information

M/s Air India Express is a wholly-owned subsidiary of Air India, operating as a separate airline, holding a valid Air Operator Certificate No. S-14 issued by DGCA. This low-cost arm of Air India is headquartered in Gurugram, Haryana. Air India Express is low-cost international airline, providing connectivity to short/medium haul international routes in the Gulf and South East Asia at affordable rates.

The scheduled operator has a fleet of 26 no.s of B737-800, 20 no.s of B737-8 and 5 NOS of A320-251N.

The line and base engineering maintenance activities of M/s Air India Express aircraft are outsourced to Air India Engineering Services Ltd. (AIESL) which is a DGCA-approved CAR 145 organization. At the time of the incident, the maintenance of Airbus A320 aircraft was being carried out by the CAR 145 agency of AIX Connect.

M/s Air India Express has a CAMO setup that monitors the continuous airworthiness requirements of the fleet of aircraft.

### 1.18. Additional information

Not Applicable

### 1.19. Useful or effective investigation techniques.

NIL

## 2. ANALYSIS

### 2.1. Serviceability of the Aircraft

As on date of the incident, the aircraft had flown 9356:18 flight hours. The certificate of Registration, certificate of Airworthiness and ARC were valid. The last major inspection carried out on the aircraft was 'E05 check'. Subsequently, all lower inspections were carried out as and when it was due.

There were no issues observed in the technical log, maintenance. There was no evidence that the aircraft was not maintained or certified in accordance with the current regulations. The investigation found no evidence of a technical defect having been causal or contributory to the incident.

### 2.2. Aerodrome

#### 2.2.1. Safety Assessment for the Apron Expansion Project

Due to the changes in apron layout, the aerodrome operator had identified confusion to the pilots due to the change in apron layout as a hazard of moderate risk 'Aircraft Incident' as a consequence. The taxiway lighting, as mentioned in the existing control section of the hazard management, was not available at the apron

taxiway. Further, the complete obliteration of the old apron taxiway pavement marking was not considered as a risk mitigation. Moreover, the status/reflectivity of the changes made to the markings/paintings during the night under the apron mast lights was not taken care of.

Hence, it is concluded that a proper safety assessment was not carried out by the aerodrome operator, which contributed to the incident.

### 2.2.2. Confusing pavement markings

The new operational apron taxiway situated 115 feet from the old greyed-out non-operational taxiway, posed a safety concern due to its visible markings. Despite being greyed out, the old taxiway lines remained clearly visible from the cockpit, particularly at night when both the new and old markings appeared similar. There was no closure marking (X mark) painted on the taxiway to indicate the permanent closure of old apron taxiway. Furthermore, the new apron taxiway lacked reflective materials, which could have clearly distinguished it from the old one. This divergence between the old and new taxiways, especially at the point where the old line turns left and the new line goes straight, created a potential for confusion among operating crews.

Reflective paints for pavement markings:

According to CAR Section 4 Series B Part 1, para 5.2.1.7, aerodromes with night operations are required to use reflective markings on the pavement to enhance visibility. The pavement markings at Surat Airport were painted with non-reflective water-based paints.

Following the incident, an observation was raised, highlighting the need for the aerodrome operator to implement reflective paint on all apron taxiways to mitigate safety risks. The operator promptly complied with this observation by painting all apron pavement markings with reflective paint.

From Para 2.2.1 and Para 2.2.2, it is evident that lack of taxiway closure marking on the old apron taxiway, improper obliteration of old apron taxiway marking, non-utilization of reflective paint for pavement markings, and the improper mitigating actions during safety risk assessment by the aerodrome operator are the contributing factors to the incident.

## 2.3. Flight Operations

### 2.3.1. Crew Awareness about the WIP (Work In Progress)

Four NOTAMs relevant to construction activities in the movement area of Surat Airport were valid on the day of the incident. These NOTAMs were expected to be discussed during the preflight briefing on the ground and the arrival briefing in-flight.

However, CVR readout indicate that only the First Officer (pilot monitoring) was aware of these activities, while the PIC mentioned it was her first time operating in

Surat. This suggests that the crew's awareness of the NOTAMs and operational factors affecting Surat Airport was insufficient.

### 2.3.2. Failure to take cognizance of the vehicles at the construction site after landing

The crew had taken the wrong (old) apron taxiway instead of the new apron taxiway at the bifurcation point at the apron area after exiting TWY B. This was due to their perception of having more brighter contrast of the old apron taxiway due to the reflection from the apron mast lights.

The apron taxiway edge lights, where construction activities were taking place, were found to be insufficient due to the small number of lights and their wide spacing. This made it difficult for the crew to identify the edges of the taxiway. Additionally, the dump truck's flashing yellow light was obscured when the bed was extended (lifted up).

Nevertheless, the apron area and taxiway were sufficiently lighted by the apron flood lights. This was confirmed by CCTV footage. While taxiing, the crew was only focused on their right side, looking out for the designated parking stand, and failed to notice the dump truck's presence on their path to their left.

Hence, a series of failures on part of the crew to take cognizance of the available cues resulted in a collision with the dump truck.

### 2.3.3. Decision to continue taxi after the collision

After the LH wing collided with the extended bed of the dump truck, the aircraft stopped for approx. eight seconds and thereafter continued to taxi. Due to the impact, the dump truck started moving forward slightly to its left. Both the PIC and FO did not see the dump truck after the collision, probably due to insufficient scanning. The CVR readout indicates that a substantial amount of jerks were felt. As the crew could not decipher any obstacles, they decided to continue taxi.

No calls were given to the ATC regarding the unusual jerk. Had the vehicle not moved ahead and sidewards, the aircraft could have again collided with the bed of the truck.

## 3. CONCLUSIONS

### 3.1. Findings

3.1.1. The Airworthiness Review Certificate of the aircraft was valid and the aircraft was maintained in accordance with the approved maintenance program. No defects were reported on the aircraft before the incident sortie. The aircraft was airworthy.

3.1.2. The flight crew were appropriately licensed and qualified to conduct the flight and were well rested. Both the pilots had undergone BA tests before the first sortie of the day and the test results were negative.

3.1.3. The complete removal of the old apron taxiway pavement marking was not considered as a risk mitigation during the safety assessment of change of apron

layout. The taxiway lighting, as declared in the existing control, was not available at the apron taxiway.

3.1.4. The old taxiway lines, despite being greyed out, remained clearly visible from the cockpit, especially at night.

3.1.5. The absence of a closure marking (X mark) on the old apron taxiway further contributed to the confusion, as it did not clearly indicate its permanent closure.

3.1.6. The new apron taxiway was not painted with reflective materials for easy identification during night operations.

3.1.7. Post incident, the aerodrome operator painted all apron pavement markings with reflective paint, as recommended by the CAR.

3.1.8. The apron area and taxiway were sufficiently illuminated by the flood lights.

3.1.9. While taking the turn from TWY B for the apron, the PIC took the non-operational apron taxiway instead of the operational apron taxiway. The FO who was assisting PIC did not notice the same.

3.1.10. The taxiway edge lights were found to be insufficient due to the small number of lights and their wide spacing. Additionally, the dump truck's flashing yellow light was obscured when the bed was extended. This made it difficult for the crew to identify the edges of the taxiway.

3.1.11. The crew was primarily focused on their right side, looking for the designated parking stand, and failed to observe the dump truck on their left.

3.1.12. The flight crew did not adequately review and discuss the relevant NOTAMs pertaining to construction activities in the Surat Airport movement area.

3.1.13. The Pilot-in-Command's lack of familiarity with Surat Airport and insufficient crew coordination regarding operational factors compromised their situational awareness during taxing.

3.1.14. After the LH wing collided with the extended bed of the dump truck, the aircraft stopped for approx. eight seconds. The crew had not reported the same to ATC and continued to taxi.

3.1.15. The collision had damaged the LH wing Slat No. 5 of the aircraft VT-ATJ.

## 3.2. Cause:

The failure of the crew to correctly identify the operational apron taxiway and following the non-operational apron taxiway and failure to take cognizance of the obstacles near the apron edge line.

### Contributory Factor:

The lack of taxiway closure marking on the old apron taxiway, improper obliteration of old apron taxiway marking, use of non-reflective pavement markings and the improper mitigating actions during safety risk assessment by the aerodrome operator are the contributing factors to the incident.

## 4. SAFETY RECOMMENDATIONS

4.1. Any other action as deemed fit on the aerodrome operator based on findings 3.1.3 to 3.1.6.

4.2. Corrective training to the crew as deemed fit by DGCA Hqrs.

Vaishnav Vijayakumar
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Member

Veeraragavan K
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Investigator-in-Charge for VT-ATJ

Date: 29th August, 2024

*** End of Report ***