

# FAA Office of Accident Investigation & Prevention

## Air India Express Limited Accident Examination

*Presented by:*

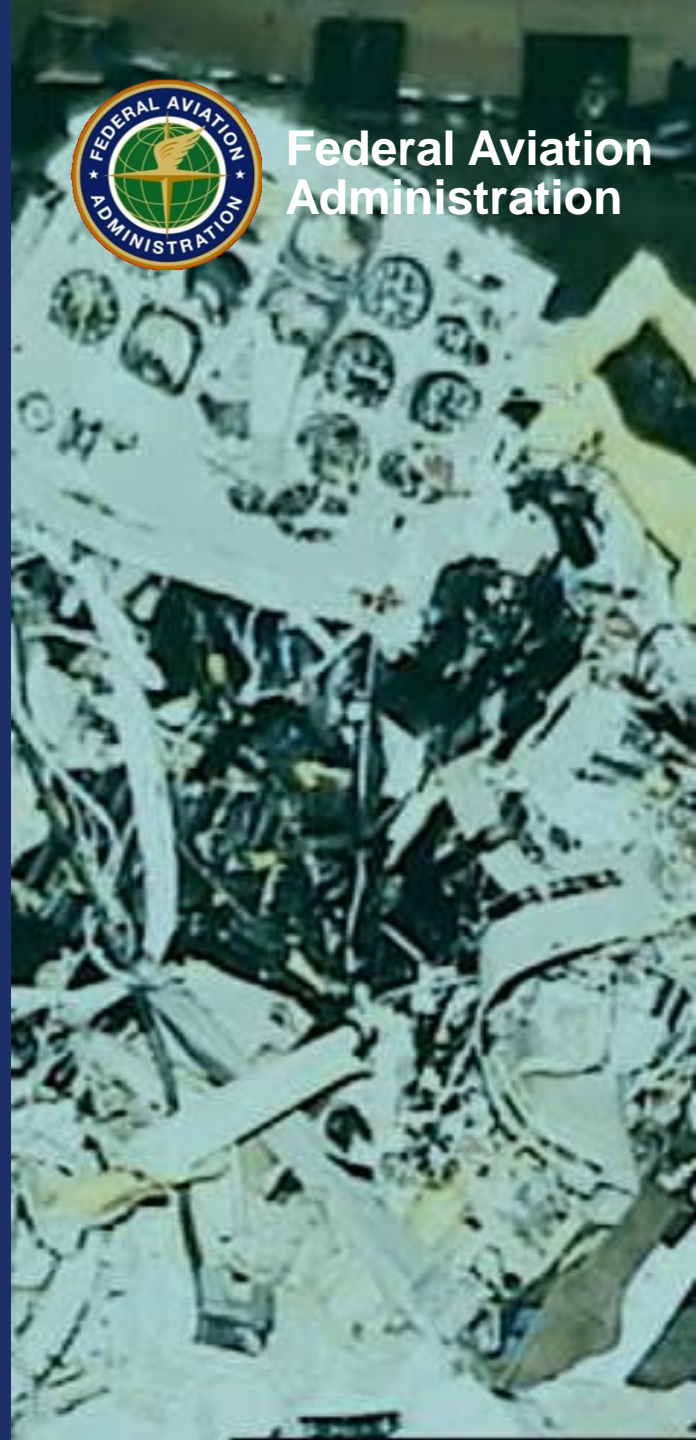
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Federal Aviation  
Administration



# Overview

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# Accident Synopsis

- Air India Express Limited - Boeing 737-800 aircraft - VT-AXH
- 07 August 2020 - 14:11 UTC (19:41 IST)
- Kozhikode, India
- A/C touched down at ~4,438 ft on 8,858 ft long RWY, in light rain with tailwind of 15 kt and a ground speed of 165 kt.
- A/C could not be stopped on RWY 10. Exited RWY at ground speed of 84 kt, continued through the RESA, breaking the ILS antennae and a fence before plummeting down the tabletop airport.
- A/C descended 110 ft below the RWY elevation and impacted the perimeter road that runs just below the tabletop RWY, at a ground speed of 41 kt. Came to an abrupt halt on the airport perimeter road just short of the perimeter wall.
- 19 pax fatalities and 75 pax serious injuries.
- Pilots received fatal injuries
- 1 cabin crew seriously injured and 3 cabin crew received minor injuries

# View of RWY - Time of Accident

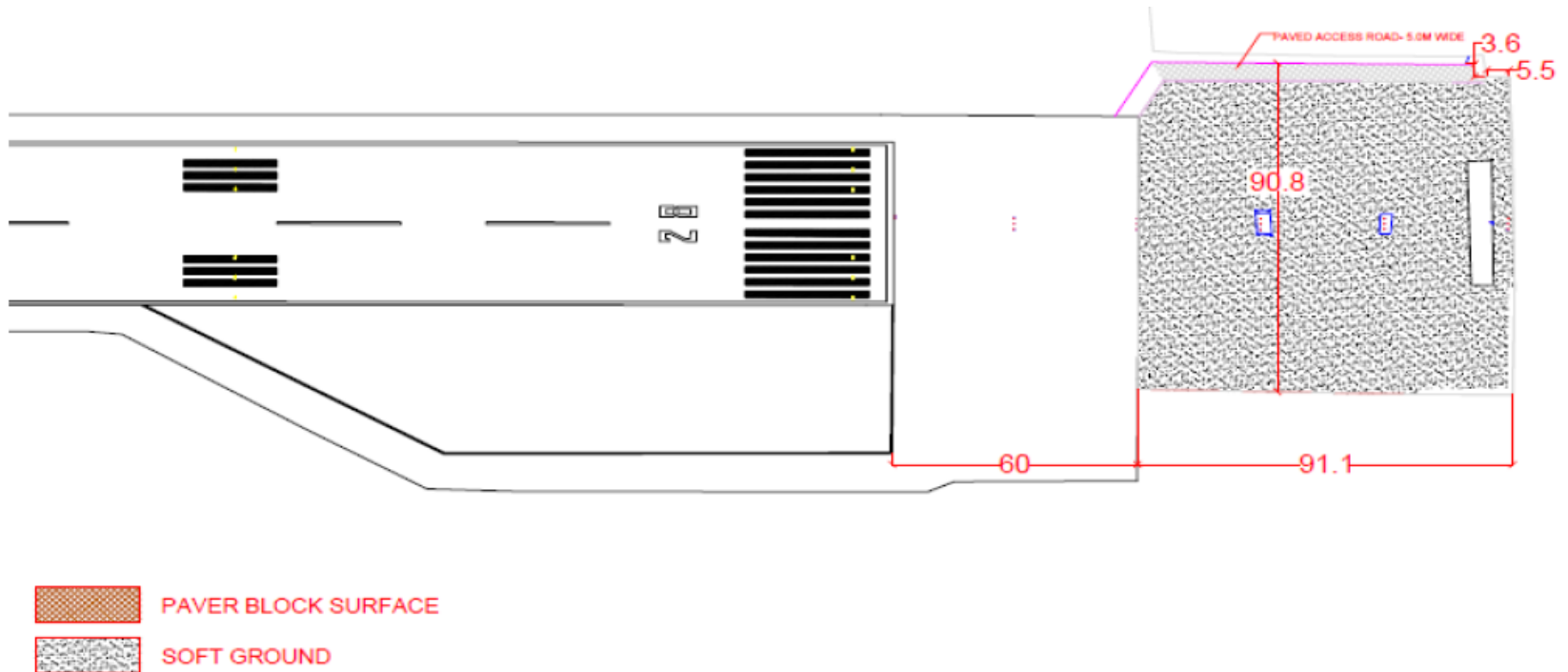


# Airport Layout





# Runway End Safety Area



# Accident Site – Initial Photo



# Accident Site





# Accident Site – RESA View



# Initial Response

- No post crash fire
- 800 liter of foam used to blanket aircraft during the rescue
- 4 ARFF Vehicles from airfield
  - 3 Crash Fire Rescue
  - 1 Rapid Intervention Vehicle
  - 4 Ambulance
- Narrow parameter road blocked with emergency vehicles, airport vehicles, and taxis caused delays in the response



# Rescue Operation

- Aerodrome Warning issued – Weather STBY prior to crash
- Crash Fire bell 14:11 UTC
- Arrival on scene ~7 minutes later at 14:18 UTC
- Additional ambulance began arriving at 14:15 UTC
- Six State Fire Apparatus arrived on scene by 14:50 UTC
- Airport taxis were used to ferry injured passengers to different hospitals around city

# Rescue Scene

- Passengers found on ground and on aircraft wings
  - Foaming was begun after initial pax recovery
  - Pilot extrication occurred 1-hour after accident
  - Forward galley cabin crew were trapped
  - Aft cabin crew opened rear exit doors to signal rescuers with their mobile phones
  - Power tools were required to extricate trapped passengers
  - Fumes caused significant discomfort for trapped pax and rescuers
- Less than 50% of pax arrived at hospital via ambulance and also no air transport was provided at crash site



# Cockpit/Flight Deck

Crew Fatal



CPT & FO seats were subject to high decel g. Seat structures were deformed and cracked. Seat mounting tracks cracked and a few seat mounting bogies were disconnected.



# Flight Deck



Control wheel and column on both sides were severely damaged. The rudder pedals were raised up and had jammed in the adjoining structure

# Forward Section

Initial impact separated the forward section from the center section, it moved forward in the direction of the perimeter wall. Impact and separation dissipated a part of the total energy and the rest was friction with road/soft ground and impact with the perimeter wall. Impact angle of 30 deg to water line.





# Center Section

- After separating from the forward section continued plunging into the road at about 30 degree angle.
- Structural members in section absorbed brunt of impact with the ground
- Floor beams were shattered, the lower lobe skin, cargo and cabin floor crumpled and separated.
- Center wing box including the center tank structure was severely damaged.
- Air conditioning damaged.
- Section of the fuselage skin, cargo floor panel, generator system tubing showed signs of gear folded back and separated on impact.
- Attached cabin equipment including seats, overhead bins, passenger service units and side wall panels fragmented and scattered over an area of approximately 300 square yards forward of the center section.
- Passenger seat headrests were bent forward due to impact with the loaded overhead bins that separated and fell down with a forward momentum.



# Center Section

Center wing box including the center tank structure was exposed and severely damaged. Section of the fuselage skin, cargo floor panel, generator cables and system tubing showed signs of a rippled pattern resembling corrugated sheet metal



# Aft Section

- Aft section separated from the center section
- Center section was supported on the belly by the edge of the perimeter road embankment.
- Due to momentum, the aft section continued moving down and separated from the center section.
- It was supported at the forward end by the base of a storm drain and at the aft end by the runway embankment.
- Due to this orientation it was at a relative angle of 10-12 degrees with the center section.





# Aft Cabin



Cabin floor structure was damaged but did not separate cleanly. Due to the height difference between the cabin floor levels of the two sections, the cabin floor rotated from horizontal to near vertical position between seat rows 23 to 26 with the seats still attached causing the passenger seats to pile up at this location. The empennage was relatively intact other than a few post impact damages.

# Doors and Emergency Exits

**L1 Door** - Unlocked, with the door handle in vertical position. The coat closet aft of the door had dislocated and leaned forward blocking the door handle operation beyond vertical position.

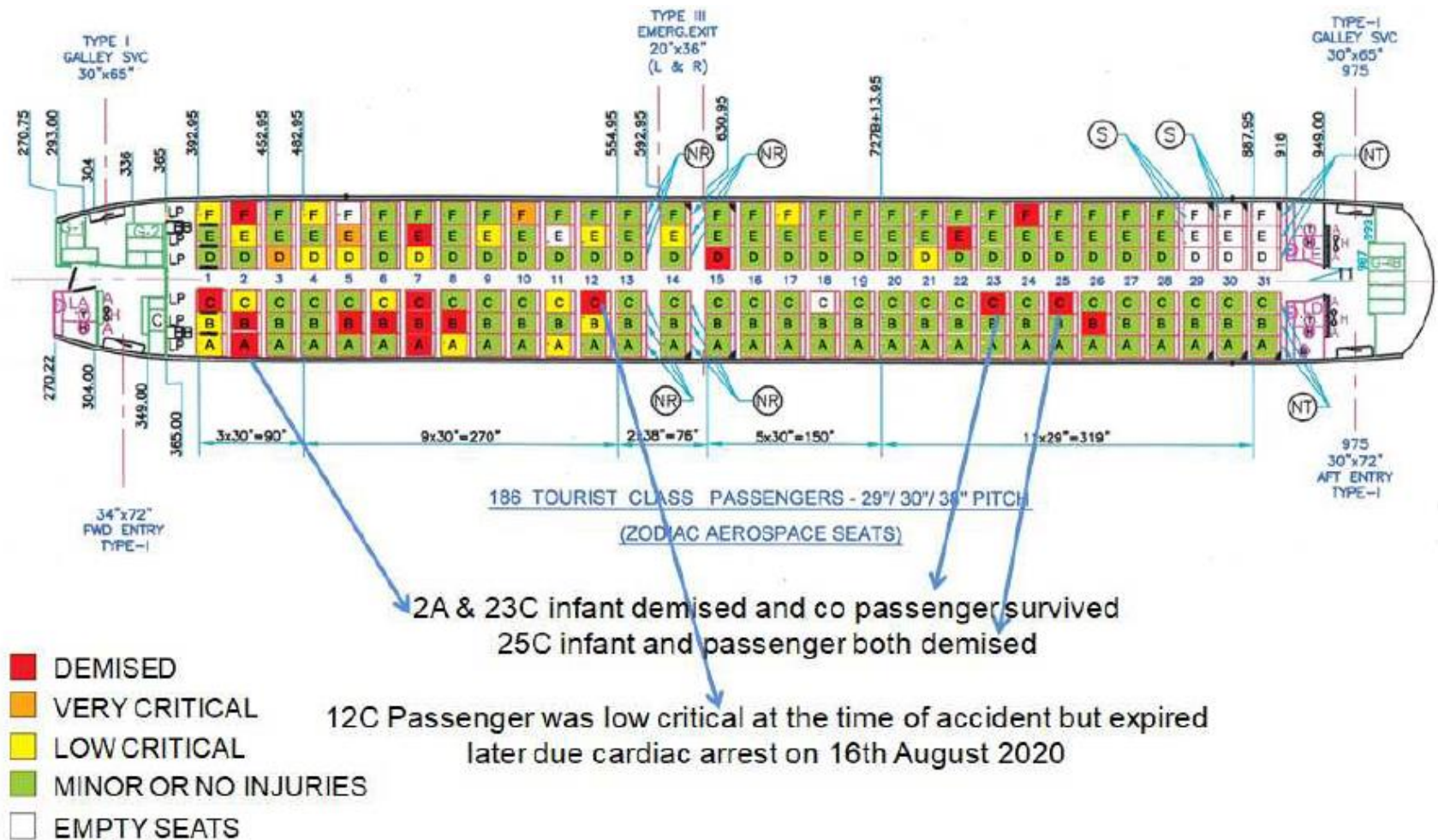
**R1 Door** - Found jammed in the door frame due to impact and the door handle was slightly lifted from the locked position.

**L2 Door** - Found open and the door handle was in the open position. Escape slide disarmed.

**R2 Door** – Found open and the door handle was in the open position.

**Overwing Emergency Exits** – All 4 were found open. Escapes straps were stowed.

# Passenger Seat Map





# Passenger Fatalities

- 16 passengers died immediately on impact
- 3 passengers died later from their injuries
- 14 passengers suffered severe head injuries
  - 05 passengers had fatal chest injuries as well
- Total of seven fatal chest injuries, but only one passenger had severe chest injury in isolation, the rest had other associated fatal injuries
- One passenger (and the PIC) had cervical spine injuries resulting in death.
- Fourth leading cause of death was multiple visceral injuries.
- Out of the three passengers who died later in hospital,
  - 2 passengers had pulmonary embolisms
  - 1 suffered cardiac arrest during management of serious multiple injuries.



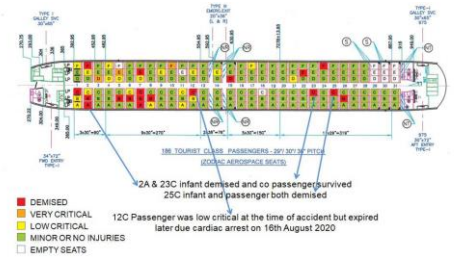
# Infant Fatalities and Injuries



- 10 infants on board who were less than 2 years of age and were not allotted independent seats. These infants were seated on the lap of their guardians during takeoff and landing:
  - 3 sustained fatal injuries
  - 3 had serious injuries
  - 4 escaped unhurt.
- The primary COD in all three infant fatalities (on seat 2A, 23C and 25C) was head injury.
- Passengers with the infants seated on seat 2A, 23C and 25C suffered a fractured right ankle, no injuries and fatal head injury respectively.

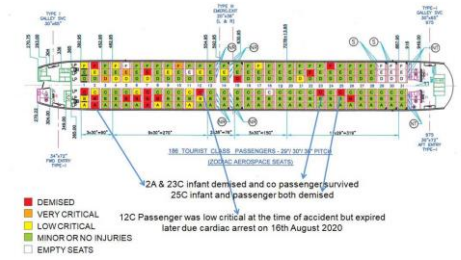


# Passenger Injuries



- Most of the injured passengers sustained multiple injuries, mostly musculoskeletal (72%). Amongst these, approximately 70% had various fractures of the lower limbs.
- There were 18 passengers with spinal fractures and three passengers had associated neural injuries resulting in paraplegia.
- Six passengers survived head injuries other than minor scalp lacerations/aberrations.

# Passenger Injuries



- Injuries (mainly fractures) of the lower limbs occurred due to direct impact and compaction between the passenger seats that moved forward due to frontal impact
- Most of the passenger seats were dislodged from the floor mounting
- Head injuries were caused most likely due to impact from the loaded overhead baggage stowage bins that separated and fell on the seats with a forward momentum
- Some injuries were caused due to the head and face hitting the aircraft structures due to inertial movement of trunk and head due to frontal impact
- Aircraft experienced significant damage between seat row numbers 2 to 10, following the impact and separation of the nose portion of the aircraft
- Almost all the passengers seated in this area (54 passengers) suffered serious or fatal musculoskeletal injuries and head injuries except passengers on 3C, INF/3C,
- 3E 5A, 8F and 9E (six passengers) sustained minor injuries
- Rows 22 to 26 suffered extensive damage due to the fact that the aircraft split up around this location. 05 out of 30 passengers seated in the area suffered fatal injuries and one suffered serious injuries. Remaining 24 passengers suffered minor injuries.

# Seat Performance Examples



Rows 23-26



# Reconstruction of Aircraft



# Contact Info

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