FROM PAPER TO PRACTICE

Strengthening Indian Aviation Policies for Enhanced Safety

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On June 12, 2025, an Air India flight AI-171 departed from Sardar Vallabhbhai Patel International Airport (SVPIA) in Ahmedabad at approximately 13:39 IST/UMST, but was unable to stay airborne for long, crashing shortly after takeoff. The aircraft struck the hostel block of Byramjee Jeejeebhoy Medical College in Meghani Nagar, just 2 kilometers from the airport. There were 242 passengers on-board, including crew. Of these, 241 lost their lives, with only one passenger surviving. The crash killed hundreds of people in the nearby hostel and surrounding areas— either from the impact itself or the fire ignited by nearly 70,000 litres of jet fuel.

This crash has brought to light a range of potential causes and highlighted the urgent need for comprehensive reforms in India's civil aviation sector as it adds to a growing list of aviation disasters where negligence in aircraft maintenance, lapses in pre-flight checks, and poor urban planning near airports have compounded the risks to flight safety. While the exact cause remains under investigation, early indications suggest that a combination of factors including technical failures, maintenance lapses, and possible human error may have contributed to the tragedy. In such complex incidents, it is rarely a single point of failure; rather, systemic weaknesses across multiple domains often intersect to produce catastrophic outcomes.

Technical and mechanical issues are a primary focus for investigators, particularly given the aircraft's abrupt loss of altitude and the mayday call issued seconds after takeoff. Experts have speculated about possible system failures, such as engine trouble or critical component malfunction, which could have rendered the pilots unable to maintain control. A new video has surfaced showing the deployment of the Ram Air Turbine (RAT) on Air India Flight AI-171. The RAT is a critical emergency device designed to deploy automatically only under extreme circumstances, specifically:

- Total electrical failure,
- Total hydraulic failure, or
- Dual engine failure.

The appearance of the RAT in the video provides strong evidence that the aircraft experienced a catastrophic systems failure during take-off.

Maintenance practices and the effectiveness of pre-flight checks had to be scrutinized, especially since the aircraft had completed previous sectors without incident. Human error is another significant area of inquiry. On-going assessments by experts in the field also suggest the main fuel-valve not turned on and the flight using reserve fuel that is used for taxiing purposes & not for take-off or to be air-borne, while less likely, the possibility of a malicious act or sabotage cannot be entirely dismissed until investigators rule it out.

This tragedy underscores the necessity for robust policy changes and systemic improvements to enhance aviation safety and prevent future incidents.

1. Maintenance Integrity & Traceability Framework

In 2023, a two-member DGCA surveillance team uncovered lapses in Air India's internal safety audits (Times of India). To prevent recurrence, mandate that DGCA-authorized inspectors perform independent examinations of all critical systems before every long-haul flight. Each checkpoint—pass or fail—must be recorded in a real-time, tamper-evident block-chain ledger.

The finalized inspection report, appended with a lightweight checksum and redundant bits, will be auto-transmitted to the arrival airport, where maintenance teams will verify integrity, crosscheck data, and proactively screen for recurring or emerging faults.

This end-to-end protocol delivers full traceability, reinforces accountability, and creates a comprehensive maintenance history—raising safety standards and streamlining operations.

2. Implementation of Airport Safety Envelopes

To significantly reduce the ground casualties from aircraft accidents during take-off and landing, India should consider the implementation of Public Safety Zones (PSZs) around the airports.

1. PSZs are risk-based safety buffer zones, typically at the ends of runways, where both building height and population density are strictly regulated to minimize the number of people at risk in the event of a crash.
2. Unlike current Indian policies which only focus on height restrictions, PSZs should also regulate population density and land uses. Residential, commercial and institutional developments should be prohibited or de-incentivized; instead

promoting low-density airport compatible users such as cargo, logistics, warehousing or green spaces.

3. This approach would ensure that airport expansion and city growth is sustainable, preventing incompatible land use and reducing long term risk.

3. MRO Accountability and Certification Protocol

A major vulnerability in India's aviation safety ecosystem stems from the lack of comprehensive background checks on maintenance companies. Both domestic and international providers are often on boarded without thorough evaluations of their financial standing, operational history, or personnel credentials. This creates exposure to potential malpractice or fraudulent operations.

Moreover, while regulatory certifications from FAA or EASA are accepted by India's DGCA, there is minimal independent due diligence conducted beyond verifying these credentials. This overreliance on foreign certification can obscure deeper operational flaws. The current system also places heavy emphasis on individual technician licenses, while neglecting the broader organizational integrity of maintenance firms. This points towards a huge lag and direct towards establishing

1. A centralized, DGCA led certification and audit mechanism that directly evaluates the financial health, operational integrity, personnel qualifications, and safety compliance of all Maintenance, Repair, and Overhaul (MRO) providers operating under Indian aviation jurisdiction.

2. DGCA will maintain a due diligence checklist covering: Ownership structure and financial solvency, Legal history and past regulatory penalties, Personnel licensing and HR policies, Quality management and training systems.

3. Airlines and OEMs subcontracting maintenance to third parties must submit verification documents for DGCA clearance before commencing work.

4. This would not only reduce the blind trust in foreign certification and add indigenous oversight but also ensures MROs are operationally stable, reducing risk of underhanded practices or shortcuts.