FEDERATION OF INDIAN PILOTS

FIP/GEN/HMOCA/25-03 **16 July 2025**

To,
Hon'ble Minister of Civil Aviation,
MOCA, Rajiv Gandhi Bhavan,
Sri Aurobindo Marg,
New Delhi – 110003

REQUEST FOR INCLUSION OF SUBJECT MATTER EXPERTS IN THE INVESTIGATION CRASH OF AI-171 & LACK OF CLARITY IN REPORT

Dear Sir,

Greetings of the seasons!!!

1. Kindly refer to our previous letter dated 23 Jun 2025 and attached data for TCMA.

2. I write this letter on behalf of the Federation of Indian Pilots (FIP) to express deep concern regarding the Preliminary Investigation Report issued by the Aircraft Accident Investigation Bureau (AAIB) in connection with the tragic accident involving Air India Flight AI-171, operated by a Boeing 787-800 Dreamliner aircraft, registration VT-ANB, which crashed during after take-off on 12 June 2025, at Ahmedabad.

3. While we appreciate the timely release of the preliminary findings, the report in its current form raises significant questions and concerns among the pilot's fraternity and the citizens of the country. It appears to infer or suggest the possibility of pilot error, without presenting any conclusive evidence or exploring well-documented technical failure modes previously observed in similar aircraft. This is particularly distressing, as it risks undermining confidence in both the investigative process and in the professionalism of Indian flight crew.

Key Technical and Investigative Concerns.

4. Simultaneous Engine Shutdown: The aircraft rotated for take-off at 08:08:35. Further, at 08:08:39 the ground/air mode transitioned to air mode. The Digital Flight Data Recorder (DFDR) reveals that the Full Authority Digital Engine Control (FADEC) system registered, fuel control switches transitioned from Run to Cut off, a commanded fuel shutoff to both engines within 1 second of each other, four secs after rotation during take-off at 08:08:42 UTC. It is humanly impossible to move the switches to cut off position in 1 sec.

5. The report does not make a mention of incident on ANA B-787 flight NH-985

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from Haneda, Tokyo to Osaka on 17Jan 2019. Some other facts are missing from the report:

a) After getting airborne the landing gear has not gone up it happens at 50-70 ft AGL. Any calls from pilots of positive rate and gear up.

b) Subsequently there is no mention of engagement of autopilot and CVR call by pilot.

c) The Cockpit Voice Recorder (CVR) confirmed one of the pilots is heard asking the other did he cut off. The other pilot responded that he did not do so. The transcript of the CVR is inconclusive It is not clear which pilot has said what. The CVR even records warnings and other parameters like click sounds of the switches. The report has not adequately covered the detailed analysis of the CVR which is a crucial piece of evidence. The pilots expressed shock and promptly began emergency action, indicating an unanticipated failure, not intentional interference.

d) Wreckage analysis confirmed that the fuel control switches were found in the RUN position, further supporting that no deliberate action had been taken by the crew to shut off the fuel.

Systemic Vulnerabilities Ignored in the Report.

6. The preliminary report has failed to sufficiently consider or acknowledge two plausible and previously documented technical scenarios, either of which could have triggered an automated shutdown of both engines:

Two Plausible Technical Scenarios.

7. FADEC-Induced Shutdown Due to Thrust Lever Angle (TLA) Sensor Fault

a) Precedence: A dual engine failure on All Nippon Airways (ANA) Flight H-985 occurred after landing at Osaka on 17 January 2019. Shortly after touchdown the pilots engaged thrust reversers but the a/c had not completed the transition from air mode to ground mode. The 787's protective system Thrust Control Malfunction Accommodation (TCMA) interpreted this as potentially dangerous "un-commanded high thrust." As a result, TCMA automatically shut down both Rolls Royce Trent 1000 engines to prevent a possible incident. The TCMA is active only if the aircraft is on the ground, so if the transition to the ground mode wasn't completed, why the TCMA entered in the loop by shutting down both the engines. All the B-787's were then checked by ANA. It could be established that same thing occurred on AI-171.

b) The Japan Transport Safety Board (JTSB) found that erroneous Thrust Lever

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Angle (TLA) sensor data caused the FADEC system to initiate a fuel cut-off in both engines without crew input.

c) It seems a similar failure in AI-171 occurred during take-off, resulting in immediate loss of power, without manual command.

8. Fuel Control Switch Lock Disengagement – FAA SAIB NM-18-33

a) Reference: U.S. Federal Aviation Administration (FAA) Special Airworthiness Information Bulletin (SAIB) NM-18-33, issued in December 2018.

b) The SAIB warned operators of Boeing 737/777/787 aircraft about potential disengagement of the fuel control switch locking mechanism, which could result in un-commanded movement and unintended shutdown.

c) The manufacturer did not mandate compliance, and Air India reportedly may not have implemented the recommended inspection, thereby exposing the aircraft to known vulnerabilities.

Electrical Control Chain of Significance.

9. It is imperative to highlight a critical technical link: The Thrust Control Malfunction Accommodation (TCMA) supplies electrical power to the Electronic Engine Controller (EEC), which governs the FADEC system. Any misbehaviour, software fault, or sensor anomaly within this chain can simulate pilot action, triggering an automated engine shutdown.
10. The report's omission of this well-known architecture and failure path — already experienced in prior Boeing 787 incidents is troubling.

Broader Context of Blame Culture.

11. This is not the first-time systemic failures within Boeing aircraft have initially been attributed to pilot error or suicidal intent, only to be disproven by subsequent investigations. Examples include: -

a) Lion Air Flight JT-610 and Ethiopian Airlines Flight ET-302 involving the 737 MAX's Maneuvering Characteristics Augmentation System (MCAS).

b) Alaska Airlines Flight 1282 door plug blowout in January 2024.

c) Ongoing FAA and U.S. Senate investigations into Boeing's systemic quality lapses (2023–2024).

12. To prematurely and indirectly suggest pilot error in preliminary report of AI-171, without thorough validation or elimination of these known technical pathways, risks not only misplaced blame but repeating past investigative failures.

Non-Inclusion Of SME's (Pilots/Engineers/Air Safety Experts)

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13. The present AAIB investigative team does not have any aviation experts and no pilot member. This committee must have very experienced experts who would be able investigate in a methodical manner without any gaps.
Even though the Investigation Committee has been formed the SME's (Type rated Pilots, Engineers and Air Safety Specialists) may now be reconstituted so that the investigations are carried in a structured manner. Our previous letter on the subject was also not taken into consideration. Now we request that SME's in aviation and preferably from B-787 be taken on board for the investigations in reconstituted investigative committee.

Conclusion and Request.

14. The Federation of Indian Pilots strongly urges that the AAIB to:

a) Reassess the role of TCMA/EEC/FADEC misinterpretation and mechanical faults, based on available FDR/CVR data and prior Boeing bulletins.
b) Avoid premature attribution of motive or intent until all system malfunctions are conclusively ruled out.
c) Engage independent technical experts to examine the TCMA / EEC / FADEC /TLA interface and fuel control mechanisms.
d) We reiterate that attributing such a catastrophic engine shutdown sequence to deliberate pilot action, while ignoring manufacturer-documented vulnerabilities, is unwarranted and unjust in the absence of incontrovertible evidence.
e) A fair and transparent investigation must include all plausible failure paths, including those embedded in aircraft architecture and vendor oversight.
f) We remain available to support the investigation with independent expertise and technical inputs, should AAIB require the same.

Thanking You,
Best Regards

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Boeing 787 LAB Notes 📒,

- The thrust control malfunction accommodation (TCMA) circuit in the EEC protects against an uncommanded and uncontrollable power surge of the engine when the throttle command is ineffective. TCMA protects against this malfunction while the airplane is on the ground.

- The TCMA is active on both channels of the EEC, and either channel can cause a shutdown of the engine. If a TCM event is detected, the TCMA function commands engine shutdown on the affected engine. The EICAS message ENG FAIL shows.

- When an event is detected, the TCMA logic energizes an electro-hydraulic servo valve by closing the engine overspeed relays. This closes the high-pressure shut-off valve (HPSOV) in the FMU and shuts off the fuel to the engine. When a TCM event is accommodated, an EEC reset or power down is necessary to reset the TCMA event and relay demands.

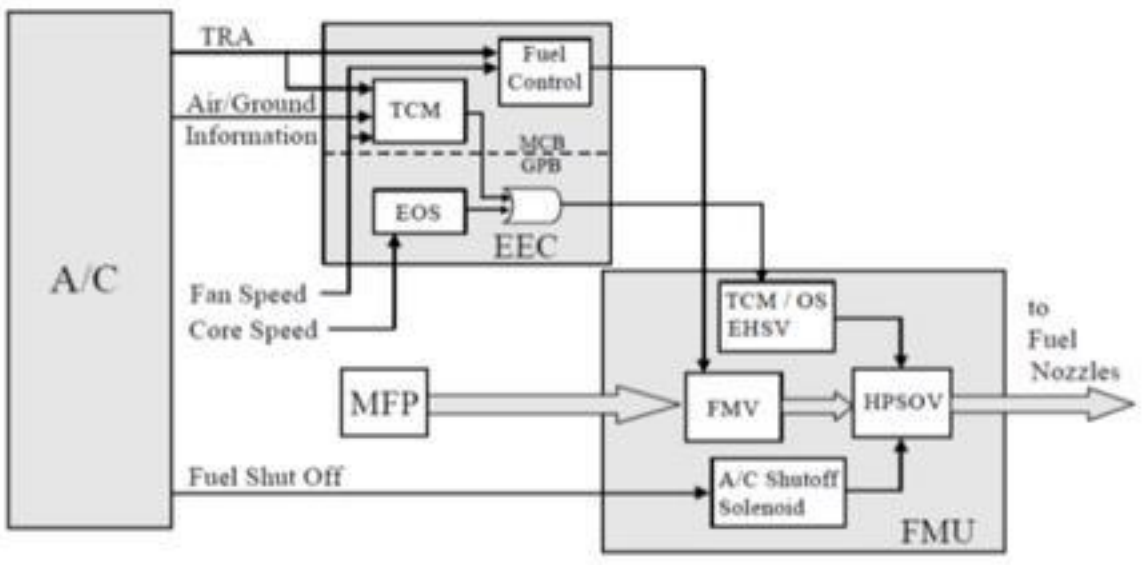
It's my personal opinion:-

A malfunction occurred in TCMA,

which sends a signal to other software logic gates that the aircraft is still on the ground or has changed its status from air to ground logic at a particular height.
TMCA is the only logic gate software behind pilot controllers that can automatically shut down the engine.

TMCA IS A single software gate on both side EEC .

The Above Information has been taken from Boeing 787 Lab Notes, which is available only to Boeing and GE Engineers.



(12) Thrust Control Malfunction Accommodation

Teaching Points

1. Thrust control malfunction accommodation (TCMA) is the engine control function that prevents a TCM event from becoming hazardous to the airplane while on the ground.

2. The TCMA function monitors engine thrust, relative to commanded thrust, and maks sure engine thrust does not adversely affect airplane safety.

3. The TCMA function makes sure the airplane handles acceptably under high asymmetric thrust conditions for on-ground conditions.

4. TCMA is in the electronic engine control system (EECS) software and hardware.

5. No single fault or common mode processor error that can cause a TCM will prevent the TCMA function from correcting for a TCM.

6. A TCM event is detected when all the following conditions are TRUE:
   - Airplane is on the ground
   - Airspeed is less than 200 knots
   - Altitude is less than 17,500 feet
   - Selected N1 is more than the TCMA threshold.

7. If a TCM event is detected, the TCMA function commands engine shutdown by energizing fuel shutoff valve (SOV) drivers, which close and mechanically latch the engine fuel valve if:
   - There is no fan speed sensor failure that would inhibit TCMA detection
   - TRA is in the idle flat or reverse region.

8. The EEC controls 2 mechanisms to shut off fuel flow:
   - Electronic overspeed system (EOS) electro-hydraulic servo valve (EHSV)
   - Fuel metering valve (FMV).

9. The TCMA also provides an engine shutdown function using shutoff hardware shared with the EOS function.

10. The TCMA function is controlled by the EEC with propulsion control system inputs:
   - Corrected fan speed
   - Thrust command
   - Altitude
   - Airplane inputs for on-ground indication and airspeed.

11. It is active on both channels of the EEC with either channel able to shut down the engine.

12. TCMA functional readiness and integrity is automatically verified by the EECS once per flight cycle (on next ground start).

13. Functional test logic can operate EOS/TCMA relay signals without latching the logic for the purpose of testing the HPSOV relay and FMU shutoff functionality.

14. This test is done on both EEC channels (first conducted by the channel in control, and then conducted by the standby channel).
   - Only the active channel controls the testing/verification and reports any faults.

15. The test will inhibit fuel flow but because it occurs before fuel-on N2 speed, there is no effect on starting.

16. It also verifies that when either EEC channel closes both its high-side and low-side switches, the HPSOV closes, inhibiting fuel flow while the FMV is fixed open.
   - If the HPSOV does not close correctly then the fuel flow is detected and the test is failed.

17. If the EEC TCMA readiness test fails, there will be and EICAS status message, ENG TCMA L/R.

Student Notes

Sytem Description Section

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FCOM

The EEC commands shutdown of the affected engine when the:
- airplane is on the ground and
- thrust lever is at idle, and
- engine is above idle speed and not decelerating normally.

The EICAS caution message ENG FAIL (L or R) is displayed with an aural beeper once the engine falls below idle speed.