The voices in the cockpit fuelling controversy over Air India crash

Air India Flight 171 crashed into a crowded neighbourhood in Ahmedabad

Seconds after take-off, both fuel-control switches on the 12-year-old Boeing 787 abruptly moved to "cut-off", cutting fuel to the engines and causing total power loss - a step normally done only after landing.

The cockpit voice recording captures one pilot asking the other why "did he cut-off", to which the person replies that he didn't. The recording doesn't clarify who said what. At the time of take-off, the co-pilot was flying the aircraft while the captain was monitoring.

The switches were returned to their normal inflight position, triggering automatic engine relight.

At the time of the crash, one engine was regaining thrust while the other had relit but had not yet recovered power.

The plane was airborne for less than a minute before crashing

Use of Brakes in Light Aeroplanes



Introduction

This is issued to remind operators and pilots of the importance of using appropriate braking techniques in light aeroplanes.

Applicability

Aircraft Operators are asked to ensure that this information is made available to their ‘in house’ or contracted maintenance organisation, to relevant outside contractors, and to all members of their staff who could have an interest in the information or who need to take appropriate action.

Discussion

Brakes absorb kinetic energy by heating up. As they heat up, they lose effectiveness, so the pilot may then use them more harshly and for longer periods, which in turn increases the heating. Whilst brake pad wear is to be expected in normal use, poor operating techniques may cause increased wear and failure of other brake components. Overheating or component failure could make the brakes totally ineffective when most needed, leading to the risk of an accident.

Problems can result from approaches being flown inaccurately – e.g. at the wrong speeds. The speeds specified in the flight manual (Vref and/or Vat) should allow a pilot to cope with most situations. Approaching too fast increases the landing distance – kinetic energy is proportional to the square of speed. If the speed is reduced by floating, the touchdown point moves further along the runway. If the aircraft is flown onto the runway at the higher speed, the brakes must absorb that energy after landing, and the landing run will be considerably increased.

A late decision to go-around also involves risks, so it is important that operations manuals include appropriate stabilised approach parameters, and these must be emphasised during flight crew training and competency checking.

Be alert for the significance of anything that seems unusual. For example, if extra power seems to be needed during taxiing, consider whether the brakes may be binding. That could result in a lack of acceleration on take-off.

It is also important to know and understand the aircraft systems. For example, in some types there may be a need to check the fluid level in the brake cylinders before flight. In some aircraft a single hydraulic system is used for the brakes and the undercarriage and/or trim systems, so any loss of hydraulic pressure may have braking implications.

Incorrect operating techniques can cause damage in less obvious ways. In one case fatigue damage to the nose gear assembly is believed to have originated from shock loads transmitted by use of a hand operated tug used for routine ground handling. It is important to ensure that the aircraft brakes have been released before any ground movement, because attempting to move a braked aircraft may cause such shock loads.

Some important reminders

* Checklists help to ensure that essential items are not overlooked.
* Make certain that brakes are applied (and lookout) before starting engines.
* Always be ready to close the throttle and/or steer towards the area of minimum danger if the brakes seem ineffective.
* Do not ride the brakes while taxiing.

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* Do not ride the brakes while taxiing.
* Be careful with tight turns and avoid excessive use of power and brakes together.
* Make sure brakes are not inadvertently applied (e.g. heels on the floor) when taking off.
* Pay attention to stabilised approach parameters.
* Aim to touch down at the correct speed in the touchdown area, and let the aircraft roll out and decelerate normally, using brakes as appropriate to the runway remaining and other conditions.
* Make proper allowances for wet and contaminated (or damp) runways and understand the techniques to prevent aquaplaning as appropriate to your aircraft type (see note).
* Use the brakes appropriately, e.g. on long runways use gentle pressure in short bursts.

Note: For example in aircraft without automatic braking systems (ABS) it may help to release the brakes before reapplying them gently, perhaps doing this several times until they grip.

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Air India plane descending moments before crash

Sumeet Sabharwal, 56, was the captain on the flight, while Clive Kunder, 32, was the co-pilot who was flying the plane. Together, the two pilots had more than 19,000 hours of flight experience - nearly half of it on the Boeing 787. Both had passed all pre-flight health checks before the crash.

A Canada-based air accident investigator, who preferred to remain unnamed, said that the excerpt of the conversation in the report presents several possibilities.

For example, "if pilot 'B' was the one who operated the switches - and did so unwittingly or unconsciously - it's understandable that they would later deny having done it," the investigator said.

"But if pilot 'A' operated the switches deliberately and with intent, he may have posed the question knowing full well that the cockpit voice recorder would be scrutinised, and with the aim of deflecting attention and avoiding identification as the one responsible.

"Even if the AAIB is eventually able to determine who said what, that doesn't decisively answer the question 'Who turned the fuel off?'".

"We may even never know the answer to that question."

Investigators told the BBC that while there appeared to be strong evidence the fuel switches were manually turned off, it's still important to keep "an open mind".

A glitch in the plane's Full Authority Digital Engine Control (FADEC) system - which monitors engine health and performance - could, in theory, trigger an automatic shutdown if it receives false signals from sensors, some pilots suggest.

However, if the pilot's exclamation - 'why did you cut-off [the fuel]?' - came after the switches moved to cut-off (as noted in the preliminary report), it would undermine that theory. The final report will likely include time-stamped dialogue and a detailed analysis of engine data to clarify this.

Speculation has been fuelled less by who said what, and more by what wasn't said.

The preliminary report withheld the full cockpit voice recorder (CVR) transcript, revealing only a single, telling line from the final moments.

This selective disclosure has raised questions: was the investigation team confident about the speakers' identities but chose to withhold the rest out of sensitivity? Or are they still uncertain whose voices they were hearing and needed more time to fully investigate the matter before publishing any conclusions?

Peter Goelz, former NTSB managing director, says the AAIB should release a voice recorder transcript with pilot voices identified.

"If any malfunctions began during take-off, they would be recorded in the Flight Data Recorder (FDR) and would likely have triggered alerts in the flight management system - alerts the crew would almost certainly have noticed and, more importantly, discussed."

Investigators are urging restraint in drawing conclusions.

"We have to be cautious because it's easy to assume that if the switches were turned off, it must mean intentional action - pilot error, suicide, or something else. And that's a dangerous path to go down with the limited information we have," Shawn Pruchnicki, a former airline accident investigator and aviation expert at Ohio State University, told the BBC.

At the same time, alternative theories continue to circulate.

Indian newspapers including the Indian Express flagged a possible [electrical fire in the tail](https://indianexpress.com/article/cities/ahmedabad/ai-crash-probe-looks-for-vital-clues-of-electric-malfunction-in-tail-wreckage-10137487/) as a key focus. But the preliminary report makes clear: the engines shut down because both fuel switches were moved to cut-off - a fact backed by recorder data. If a tail fire occurred, it likely happened post-impact, triggered by spilled fuel or damaged batteries, an independent investigator said.

Last week, AAIB chief GVG Yugandhar stressed that the preliminary report aims to "provide information about 'WHAT' happened".

"It's too early for definite conclusions," he said, emphasising the investigation is ongoing and the final report will identify "root causes and recommendations". He also pledged to share updates on "technical or public interest matters" as they arise.

Summing up, Mr Pruchnicki said the probe "boils down to two possibilities - either deliberate action or confusion, or an automation-related issue".

"The report doesn't rush to blame human error or intent; there's no proof it was done intentionally," he added.

In other words, no smoking gun - just an uneasy wait for answers that may never even fully emerge.

