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# **AIR PILOTS - COMMERCIAL AIR TRANSPORT SAFETY BRIEFING NOTE 16**

[Issued 07 July 2025]

## **EFFECTIVE MONITORING**

### **The Context**

The role of the pilot acting as 'Pilot Monitoring' (PM) is the ultimate human factors mitigation supporting safe operations regardless of what may be significant differences in the relevant experience of pilots working together. However, this extremely important responsibility often receives insufficient attention in pilot initial and recurrent training for both the PM and Pilot Flying (PF) roles. Many of the practical difficulties with monitoring have their roots in the existence of an authority gradient between two pilots operating together as a team. Different levels of relevant aircraft type experience, familiarity with multi-crew operations, military or civil prior experience and cultural background can be relevant and need to be proactively recognised. There are obvious potential challenges when a crew gradient of any sort is relatively steep but different issues can arise even when the experience-based authority gradient is low. Inevitably, it is easier to illustrate the challenges which can be presented by monitoring when lapses are found to have contributed to actual or potential unsafe outcomes and such instances should therefore be recognised and internally reported whether or not also detectable via Flight Data Monitoring.

### **Some examples of ineffective monitoring**

- In 2023, an Airbus A330-300 touched down prior to the Amsterdam runway threshold at night as a consequence of the PF Captain's concern that the runway allocated was much shorter than those routinely used - although not in any way performance limiting. Neither the operating First Officer nor the Observing Relief First Officer commented when descent below the PAPI began or as it continued to increase and eventually exceeded full scale deflection.<sup>1</sup>
- In 2021, a Bombardier CRJ 1000 First Officer continued a night offset baro-VNAV RNP approach to Nantes using an incorrect vertical approach profile after the Captain's incorrect readback of the correctly given QNH went undetected by ATC APP. The TWR controller's subsequent MSAW-triggered query about their altitude was initially ignored but the error was eventually recognised just above MDA and the correct profile was regained.<sup>2</sup>
- In 2020, an Embraer E170-100 First Officer commenced a windshear go-around from short final at Paris CDG but did not track the runway extended centreline. The aircraft drifted towards the parallel runway from which an A320 was departing. Co-ordinated TCAS RAs occurred and were followed.<sup>3</sup>
- In 2023, a Boeing 777-300 Captain taxiing for a night departure at New York JFK failed to follow the clearance given and neither the operating nor the relief First Officer noticed. The aircraft then crossed an active RWSL-protected runway as a Boeing 737-900 was taking off. The 737s promptly-initiated rejection led to it stopping just before the crossing point as the 777 cleared the runway.<sup>4</sup>
- In 2023, a Boeing 737-700 First Officer took off from Las Vegas in excellent night visibility without either pilot realising that the aircraft was not aligned with the unlit centreline. The inexperienced First Officer was still head-down completing his assigned taxi-out tasks as the runway was entered so it was the Captain who had incorrectly positioned the aircraft on the runway edge lights. There was absolutely no external (ATC or operator schedule) pressure to commence takeoff without delay.<sup>5</sup>

<sup>1</sup> <https://onderzoeksraad.nl/wp-content/uploads/2024/07/Touchdown-before-threshold-Risks-associated-with-a-large-aircraft-landing-on-a-short-runway.pdf>

<sup>2</sup> [https://bea.aero/fileadmin/user\\_upload/F-HMLD\\_EN.pdf](https://bea.aero/fileadmin/user_upload/F-HMLD_EN.pdf)

<sup>3</sup> [https://bea.aero/fileadmin/user\\_upload/F-HBXXK.EN.pdf](https://bea.aero/fileadmin/user_upload/F-HBXXK.EN.pdf)

<sup>4</sup> <https://www.nts.gov/investigations/AccidentReports/Reports/AIR2401.pdf>

<sup>5</sup> <https://www.tsb.gc.ca/sites/default/files/rapports-reports/aviation/A23f0062/eng/A23f0062.pdf>

- In 2022, a Boeing 777-200 PF Captain failed to maintain the initial climb during the flap retraction phase and descent in controlled flight and in cloud from 2,100 feet asl continued until he responded to an [[EGPWS]] 'PULL UP' Warning and re-started the climb from 748 feet asl. An earlier tentative query made by the low experience First Officer just prior to the descent when the Captain appeared to be "having difficulty with airspeed control" received no response and was not followed up.<sup>6</sup>

## Discussion

Ineffective monitoring during routine operations underlies many unintended flight management errors. Whilst it sometimes involves First Officers, Captains acting as PM are not immune. Circumstantial evidence as in these examples also supports the presence in some Captains of either complacency or failure to recognise that an inexperienced PM will sometimes need to focus on their direct tasks at the expense of their parallel function monitoring a PF Captain's aircraft control both on the ground and in the air. When pilots with similar levels of relevant experience and/or the same rank are operating together, the potential issues with effective monitoring can be very different to versions of the more usual authority gradient context but still exist and should be proactively reviewed pre-flight.

## Safety Recommendations

### To Aircraft Operators

- All pilot simulator and line training, both initial and recurrent, must address the critical importance of effective monitoring as a contribution to safe aircraft operation and do so by effectively managing the potential consequences of whatever authority gradient exists between two pilots.
- Pilot training should particularly emphasise the need for both pilots to passively monitor the actions of their colleague whilst primarily focusing on their own actions. Junior pilots acting as PM should be particularly encouraged to prioritise monitoring PF aircraft control actions over less time-critical routine support tasks when appropriate.
- All start-of-duty flight crew briefings should explicitly discuss how effective monitoring both on the ground and in the air can be delivered noting any specifics such as weather or despatch-allowable defects which may be relevant. Monitoring of the response to ATC ground and airborne clearances and correct readback and setting of altimeter subscales should be highlighted.
- Use of low workload periods in flight to prepare for busier times ahead should be encouraged.
- A flight crew debrief could usefully be required after all flights or at the end of a flight duty period.

### To Pilots

- The start of duty Captain's briefing is a key foundation in which the subject of monitoring must be covered in a way which is adapted to suit the relevant experience of all crew members and any relief pilots. Achieving and maintaining effective monitoring whilst working together means recognising that even a very experienced PF can sometimes briefly lose situational awareness when the PM does not.
- Whilst Captains must always prioritise overall responsibility for the safety of the aircraft, they must try to ensure that the other pilot appropriately blends their own primary tasks with effective monitoring of the overall conduct of the flight. However, an inexperienced PM First Officer must never be overloaded before takeoff or once airborne due to time pressure created or accepted by the Captain.
- Although a less experienced PM should recognise that their PF may well be able to see the 'big picture' more clearly and that in difficult weather or other challenging operating conditions will be best placed to judge the limit of safe operations, that must not preclude comment or even intervention if judged appropriate. Such action might be easier if it began with a phrase such as "I'm uncomfortable".
- Any in-flight situation which has the potential to simultaneously create a high workload for both pilots should normally be mitigated by maximum use of automation by the PF because such a scenario may reduce both pilots' ability to effectively monitor manual flight path management.
- All pilots should recognise that greater relevant and recent experience is likely to be accompanied by a larger 'circle of confidence' in respect of what can be safely achieved in challenging weather or system malfunction situations and that familiarity and compliance with SOPs is the foundation of this.
- Mismanaged unexpected go-arounds can lead to potentially or actually hazardous circumstances which could have been avoided if both pilots had reviewed the sequence of actions during descent. A PM would then be better prepared to monitor and if necessary prompt or even take over control.

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<sup>6</sup> <https://data.nts.gov/carol-repgen/api/Aviation/ReportMain/GenerateNewestReport/105216/pdf>