

**Boeing 737-800,
G-JZHL**

**Kuusamo Airport,
Finland**

1 December 2021

Serious Incident

Investigation Synopsis

This investigation was delegated to the AAIB by the Safety Investigation Authority of Finland.

During takeoff from Kuusamo Airport in Finland the flight crew inadvertently left the thrust set at the 70% engine run-up setting rather than the 89% required for takeoff. The aircraft became airborne with 400 m of runway remaining and climbed away slowly. At 250 ft agl the flight crew realised they had insufficient thrust and applied the correct power. The flight continued without further incident.

The thrust was not set correctly because the TOGA button was not pressed. It was not pressed because the co-pilot was startled by the aircraft starting to move when he set 70% power against the brakes. The aircraft started to move because the co-pilot applied insufficient brake pressure. The commander was distracted by a radio call and neither he, nor the co-pilot, checked the thrust was correctly set.

The AAIB has investigated several takeoff performance incidents across the industry. This incident is further evidence that the current barriers designed to prevent these events are not fully effective, and improved reliability is likely only through the introduction of a technical barrier. A Safety Recommendation is therefore made to develop technical specifications and, ultimately, certification standards for a technical solution.

A Safety Recommendation is also made to improve the detection of takeoffs with compromised performance, to support the prompt reporting of occurrences.

Safety Recommendation 2022-018

Justification

The AAIB and other SIAs have investigated many takeoff performance incidents which have resulted in aircraft taking off with insufficient thrust. The circumstances of each incident differ but the outcome is the same. The human checks currently in place do not always stop these incidents occurring. Whilst they are effective in many cases, such checks are occasionally omitted or fail to detect errors because there is a limit to the reliability that can be achieved with any human task. Higher levels of reliability are likely to require technological intervention to detect abnormally low acceleration during takeoff in time to enable crews to safely reject the takeoff. SR 2018-014, made to EASA, addressed this issue when the UK was part of the EU. SR 2022-018 addresses the same issue but is made to the UK CAA.

Therefore, the following safety recommendation was made:

Safety Recommendation 2022-018

It is recommended that the UK Civil Aviation Authority, in conjunction with other regulatory authorities, develop a set of technical specifications and, subsequently, develop certification standards for an on-board system that will alert the crew of an aircraft to abnormally low acceleration during takeoff.

Date Safety Recommendation made: 29 September 2022

LATEST RESPONSE

Response received: 02 December 2022

The UK CAA accepts this Safety recommendation.

In order to ensure any UK position is coordinated with other key aviation regulatory bodies, we have started engagement to determine what, if any, parallel workstreams are already in process. We have also started engagement with Organisations developing standards for Aviation Equipment to understand if they have already been approached to work towards an agreed Minimum Operational Performance Standard (MOPS) for any design solution. Any future mandate that is associated with agreed technical specifications will require further consultation – ideally with a coordinated regulatory action.

A workshop with key UK airlines is planned for Q1 2023 to start the initial scope of a technical solution. This will be followed by OEM meetings and further regulator outreach to try and maintain common collective position. The consequences and viability of a UK only approach will have to be considered in due course if a more global consensus is not possible.

The Civil Aviation Authority would like to propose that our next update to AAIB recommendation 2022-018 shall be provided by the end of June 2023.

Safety Recommendation Status **Open**

AAIB Assessment **Adequate**

Action Status **Planned Action Ongoing Update Due 30 June 2023**

Feedback rationale

The AAIB looks forward to an update by the end of June 2023.

RESPONSE HISTORY

N/A

(SRIS Reference:)

Safety Recommendation 2022-019

Justification

Flight data monitoring (FDM) can be used to monitor the frequency of occurrences of takeoff performance events and to ensure they are reported appropriately. EASA has published guidance material on the subject and has recommended that operators implement in their FDM programmes specific algorithms to detect precursors relevant to the monitoring of takeoff performance. SR 2022-019 aims to encourage operators to use FDM in this way.

Therefore, the following safety recommendation was made:

Safety Recommendation 2022-019

It is recommended that the UK Civil Aviation Authority encourage all UK Air Operator Certificate holders to implement into their flight data monitoring programme algorithms to detect the precursors relevant to the monitoring of takeoff performance detailed in the European Operators Flight Data Monitoring Document, Guidance for the implementation of flight data monitoring precursors.

Date Safety Recommendation made: 29 September 2022

LATEST RESPONSE

Response received: 02 December 2022

The UK CAA accepts this Safety recommendation.

The UK CAA recognises that the identification of the correct threat line, which could lead to a runway excursion event, is an important part of any safety risk mitigation strategies for the Take-off Performance errors.

The UK CAA will seek to maximise the safety benefit of the Flight Data Monitoring (FDM) programmes by

- Identifying FDM events that can be easily linked to take-off performance errors as 'precursors' to the undesired outcome (runway excursion).
- Agree on common trigger values that could be used to produce a wider data set to identify sector risks to share with all operators, subject to confidential protocols being agreed and accepted.

We plan to do this by working with large Air Operator Certificate (AOC) organisations through dedicated workshops and publish FDM 'best practice considerations' by the end of 2023.

The Civil Aviation Authority would like to propose that our next update to AAIB recommendation 2022-019 shall be provided by the end of June 2023.

Safety Recommendation Status Open

AAIB Assessment Adequate

Action Status Planned Action Ongoing Update Due 30 June 2023

Feedback rationale

The AAIB looks forward to an update by the end of June 2023.

RESPONSE HISTORY

N/A

(SRIS Reference:)