



U.S. Department  
of Transportation  
**Federal Aviation  
Administration**

800 Independence Ave., S.W.  
Washington, D.C. 20591

January 17, 2024

Mr. Chris van Dam  
Chairman  
Dutch Safety Board  
PO Box 95404  
2509 CK The Hague  
The Netherlands

Dear Chairman van Dam:

This letter is our final response to Federal Aviation Administration (FAA) Safety Recommendation 21.091, received on June 4, 2021, and supplements our previous letters. The Dutch Safety Board (DSB) issued this recommendation as a result of the incident that occurred on April 21, 2017, in which a Boeing 777 took off from Amsterdam Airport Schiphol (AMS) in the Netherlands. During the initial climb, the flight crew was informed by air traffic control that probably a tail strike had occurred. The crew decided to treat the event as an actual tail strike and returned to Schiphol. After landing, it appeared that a tail strike had occurred, but that the wear of the tail skid shoe was within limits and no immediate repair was necessary.

21.091. To take the initiative in the development of specifications and, subsequently, develop requirements for an independent onboard system that detects gross input errors in the process of takeoff performance calculations and/or alerts the flight crew during takeoff of abnormal low accelerations for the actual aeroplane configuration as well as insufficient runway length available in case of intersection takeoffs. Take this initiative in close consult with the aviation industry, including manufacturers of commercial jetliners amongst which in any case The Boeing Company.

FAA Comment. In our previous letter, the FAA informed the Board that the Flight Path Management Advisory Circular (AC) was scheduled to be published by the first half of Calendar Year 2023. We also noted that we did not see justification to mandate installation of the equipment suggested in this safety recommendation but would continue to explore whether incorporating a takeoff performance monitoring system would be suitable for a voluntary safety enhancement effort.

On November 21, 2022, the FAA published AC 120-123, Flightpath Management. This AC provides guidance for operators in developing operational policies, procedures, and training to reduce the likelihood of automated system input and usage errors. The flightcrew training includes procedures, tools, and techniques to help pilots cross-check each other and the automated system, in a combined effort to trap potential errors. This AC is available at the following website:

[https://www.faa.gov/documentLibrary/media/Advisory\\_Circular/AC\\_120-123.pdf](https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_120-123.pdf)

In addition, on May 15, 2020, the Flight Deck & Handling Qualities Standards for Transport Aircraft committee published AS8044A, Takeoff Performance Monitor (TOPM) System for Airplanes. This document established the means for a minimum performance standard through its conclusion that “the function of takeoff performance monitoring has moved from a separate or federated avionics system to one being incorporated within aircrafts’ Integrated Modular Avionics architectures.” More information concerning AS8044A is available at SAE.org. Additionally, Boeing announced in 2020 that an integrated takeoff monitoring system for Boeing airplanes was in development.

Airbus has also developed the following Takeoff Surveillance (TOS) functions enhancing the system safety:

- TOS pack 1, implemented in 2009, improves the checks performed on flaps and trim settings, and adds a check of the performance parameters entered in the Flight Management System (FMS) (aircraft weight and takeoff speeds).
- TOS pack 2, implemented in 2018, checks that the aircraft is positioned on the intended runway and that the expected takeoff performance (based on data entered in the FMS by the crew) is compatible with the runway distance available; and
- Takeoff Monitoring (TOM), implemented in 2018, monitors the acceleration of the aircraft during the takeoff phase and warning the flight crew if a lower-than-expected acceleration is detected, as an effort to “provide additional safety-nets to support the flight crew during takeoff preparation and takeoff roll.

Based on this information, the FAA has concluded that the safety intent behind mandating an integrated takeoff performance and monitoring system, is already being addressed. Additionally, our actions in updating AC 120-27F, Aircraft Weight and Balance Control, which allows for operators to develop and receive approval for a weight and balance control program for aircraft operated under Title 14, *Code of Federal Regulations* (CFR) Parts 91, subpart K, 121, 125, and 135, along with AC 120-123, meet the intent of this Safety Recommendation.

I believe the FAA has effectively addressed this safety recommendation and consider our actions complete.

The FAA would like to thank the DSB for submitting FAA Safety Recommendation 21.091 and its continued interest in aviation safety. If you have any questions, or need additional information regarding this safety recommendation, please contact the FAA Safety Recommendations Program staff at [REDACTED]@faa.gov. Alternatively, you may contact [REDACTED], AVP-420, at (202) [REDACTED]

Sincerely,

A redacted signature consisting of two black rectangular boxes. The first box is on the left and the second is on the right, slightly overlapping the first.

Kimberly R. Pyle  
Aviation Safety  
Executive Director,  
Office of Accident Investigation and Prevention