



Carol A.J.F. Verheij
Secretary Director
Dutch Safety Board
PO Box 95404
2509 CK The Hague
The Netherlands

Date 14 January 2021

Ref Letter 20.0003723

Dear Mrs. Verheij,

Subject: Publication Final Report - Erroneous take-off performance calculation, Boeing 777

Thank you for your letter, dated 14 October 2020, in which you share the final report about a serious incident involving a Boeing 777 at Amsterdam Airport on 21 April 2017.

IATA welcomes the Dutch Safety Board (DSB) invitation to comment on the incident. IATA has reviewed the final report and presents this letter as a response.

Specific to the DSB request for IATA: **“To develop a standard policy for airlines with regard to procedures for reduced thrust takeoffs, including a risk analysis addressing cost reductions versus introduced safety risks”**, we wish to provide the following comments:

- a. There appears to be missing in the report, recommendations to address the root cause of this event. The report focuses on recovery barriers (how to detect the error that is already made) instead of preventive barriers (how to prevent errors from being made). Both types of barriers are important to prevent take-off performance related events, and by placing the report focus only on recovery barriers which are complex to implement and can take many years, we believe the report omits a critical mitigation.
- b. Airlines have applied reduced thrust take off procedures for many years and, utilizing their internal Safety Management Systems to identify hazards and safety risks, have developed clear Standard Operating Procedures (SOP) to ensure reduced thrust take-offs are done safely. The SOP are not developed and implemented in isolation, but in consultation with Original Equipment Manufacturers (OEM) and approved by the Competent Authority responsible for the oversight of the airline. It has proved to be a safe, effective and efficient means to operate aircraft.
- c. Given this report identifies causal factors including stress, time pressure, poor communication and failure to adhere to SOP, it should be noted that airlines initial, and recurrent safety training of crew, includes detailed Crew Resource Management (CRM) training to continually highlight the importance of SOP, and the consistent application of Threat and Error Management (TEM), to mitigate safety risks.
- d. When assessing any safety risk associated with a reduced thrust take-off, it is necessary to factor in any risk introduced to the operation against the safety benefits, and other positive attributes of utilizing this procedure. The following factors, amongst others, should be considered:



- i. Reduced likelihood of altitude busts on departure – a reduced thrust setting at take-off, and in the initial climb, reduces the possibility of exceeding the initial platform altitude due to an excessive climb rate after departure;
 - ii. Reduced likelihood of flap exceedances – a reduced thrust setting at take-off, and in the initial climb to acceleration, reduces the possibility of a flap exceedance due to a lower acceleration at flap retraction altitude;
 - iii. Reduced likelihood of Traffic Collision Avoidance System (TCAS) traffic (TA) and resolution (RA) advisories on departure due excessive closure rate, with other aircraft within an airports Terminal Maneuvering Area;
 - iv. Reduced engine wear – reduce thrust take-off applies the necessary aircraft thrust, taking into consideration runway characteristics and environmental factors, for a safe aircraft departure without applying full rated thrust at each take-off. This reduces unnecessary stressors on the engine, when full thrust is not required, and reduced thrust provides sufficient safety margins for an aircraft departure off a runway that is not performance limiting.
Reduced engines wear, because of reduced thrust take-off procedures, has contributed to increased engine reliability. The Flight Safety Foundation article <https://flightsafety.org/asw-article/when-less-is-more/> provides some specific considerations on the issue;
 - v. Reduced noise pollution – reduced engine thrust at take-off reduces noise around airport of operation ensuring that aircraft complies safely with local regulations;
 - vi. Reduced fuel consumption – reduced thrust take-off reduces aircraft fuel burn on departure which, in turn, reduces the carbon footprint of aviation to support global environmental targets.
- e. The IATA Operational Safety Audit (IOSA) develops safety standards for air operators and audits these on a two-year basis. The IOSA Standards Manual (ISM, available at www.iata.org/iosa) contains requirements related to the procedures that include:
- i. IOSA requires operators to have a load control system that, among others, provides for information, to include last minute changes, that is in agreement with the actual load on the aircraft and presented on a final load sheet (refer to GRH 3.3.1);
 - ii. Operators are required to have guidance that enables flight crew to prepare and/or accept a load sheet with accurate aircraft weight/mass and balance calculations for each flight (refer to FLT 3.7.3). Such guidance must incorporate flight crew procedures for preparing or accepting last minute changes (LMC) to the load sheet, to include guidance for the maximum allowable difference between planned and actual weights;
 - iii. Operators must demonstrate policy and procedures that require flight crew members to crosscheck and confirm critical actions during normal, abnormal and emergency situations, to include weight/mass and balance calculations and associated AFS/FMS entries and performance calculations or inputs, including AFS/FMS entries (refer to FLT 3.11.20);
 - iv. In accordance with established Safety Management System (SMS) principles, Operators are required to demonstrate the organization-wide implementation of hazard identification programs, safety risk assessments and mitigation programs;
 - v. The hazard identification program must include a combination of reactive and proactive methods of hazard identification and processes for safety data analysis that identify existing hazards, and may predict future hazards, to aircraft operations (refer to ORG 3.1.1);
 - vi. Safety risk assessment and mitigation are required to ensure hazards are analyzed to determine corresponding safety risks to aircraft operations. Safety risks are assessed to determine the required risk mitigation and, where required, risk mitigation actions are developed and implemented (refer to ORG 3.1.2 and its repeated standards throughout all operational disciplines);



- vii. The IOSA Program has established protocols for the development of standards and recommended practices. As a program policy, these are primarily derived from applicable ICAO standards and recommended practices which include industry best practices. IOSA does not proactively develop policies as such, but rather embeds identified policies, standards or other specifications into its ISM, in accordance with the aforementioned protocols.

In conclusion, and taking into consideration all the points above:

- IATA is committed to support industry's safety needs, including the recommendation made by the DSB, and will consider if new specifications, in accordance within IATA protocols and membership governance, are required;
- IATA believes it would be inappropriate to conduct a risk analysis addressing cost reductions versus introduced safety risks, since this is not a relevant factor in the decision to use the reduced thrust procedure in the first place. It is rather the safety benefits, and other factors, that reduced thrust take-off procedures provide, which have guided such decision. Instead, it would be more beneficial to acknowledge the positive safety benefits that reduced thrust take-offs provide and focus on understanding, through root-cause analysis, on where incorrect take-off performance occurs through errors, slips and lapses;
- IATA will continue to monitor technical solutions to support a reduced likelihood of incorrect take-off data being applied and, in liaison with our industry partners, will work to bring these safety enhancements into daily operation.

Yours sincerely,

A handwritten signature in blue ink, appearing to read "Comber", is written in a cursive style.

Michael Comber
Director, Member & External Relations, ICAO