

# Japan Transport Safety Board DIGESTS

JTTSB (Japan Transport Safety Board) DIGESTS

Number 44 (issued on March, 2024)



## Aviation Accident Analysis Report

### -Preparing for sudden turbulence during flight-

## Preventing accidents caused by aircraft turbulence

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### Chapter 1 Introduction

The eradication of accidents caused by aircraft turbulence (hereinafter referred to as "turbulence accidents") has been a long-standing challenge for all airlines, with ongoing efforts to prevent them. However, in 2022, six turbulence accidents occurred, the highest number in the past 20 years. In recent years, this type of accident has accounted for more than half of all accidents involving large aircraft, and among accidents resulting in serious injuries, the majority were turbulence-related. On the other hand, some cases have demonstrated that proper responses can mitigate damage; therefore, learning from past accidents and taking preventive measures is an effective approach to reducing future occurrences.



Source: Japan aerospace exploration agency

Figure 1: Conceptual diagram of aircraft turbulence reduction technology

In this JTTSB Digest, we will build upon the content of Digest No. 15 (August 2014) – Preventing Accidents Caused by Aircraft Turbulence by incorporating recent accident trends, injury statistics, and an analysis of turbulence-related factors, which account for the majority of causes. Additionally, we will introduce accident investigation cases conducted by the JTTSB and explain current measures to prevent accidents and mitigate damage, including technological advancements in turbulence avoidance (see Figure 1).

In this digest, "turbulence accidents" refer to aviation accidents investigated by the Japan Transport Safety Board (including the former Aircraft and Railway Accident Investigation Commission) between 2004 and 2023, in which turbulence-induced aircraft movement caused serious injuries to passengers or cabin crew on large airliners (maximum takeoff weight exceeding 5,700 kg). Please note that some of the data presented may include ongoing investigations.