

## TURBULENCE-RELATED INJURIES TO CREW &amp; PASSENGERS

Date: 01.09.2024

№: CABIN 2024-0002

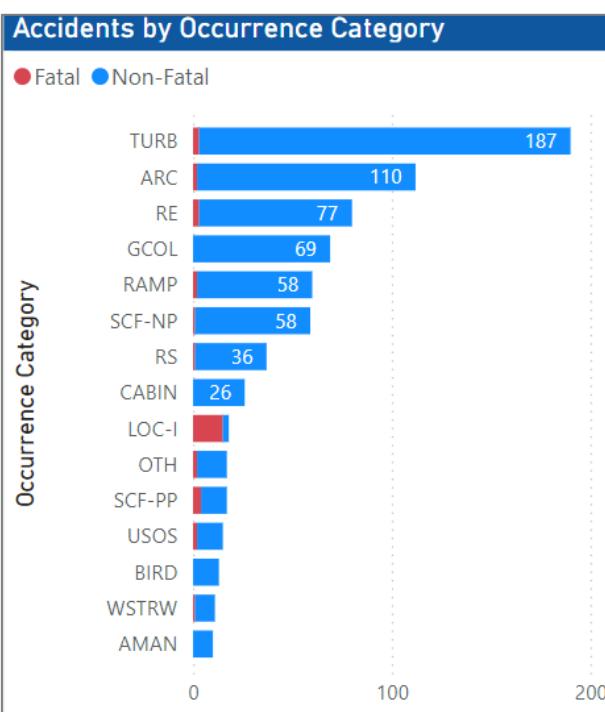
Cabin Crew

Revision: 00

## 1. PURPOSE

This current safety information is published for the purpose of alerting the operators and cabin crew members about the potential dangers associated with turbulence, as well as to emphasize the need for a thorough internal investigation of all events related to adverse weather to improve the effectiveness of measures taken to ensure flight safety.

## 2. BACKGROUND



The data obtained using the ICAO Integrated Safety Trend Analysis and Reporting System (ICAO iSTARS 4.0) demonstrate that turbulence currently "tops" aviation accident statistics. Climate change is likely to continue to affect the frequency and intensity of dangerous weather conditions, as well as where and at what time of the year these phenomena will occur

Since among non-fatal aviation accidents turbulence is the main cause of injuries to passengers and cabin crews during flight, JSC Aviation Administration of Kazakhstan (*hereinafter – AAK*) analyzed information about aviation accidents which is available on [The Aviation Herald](#) website.

An analysis of the events available in the database of this website showed that in the first half of 2023 and 2024, 15 aviation accidents occurred each related to aircraft entering a zone of high turbulence. At the same time, the number of causalities who suffered injuries of varying severity increased almost twice in 2024, one person died.

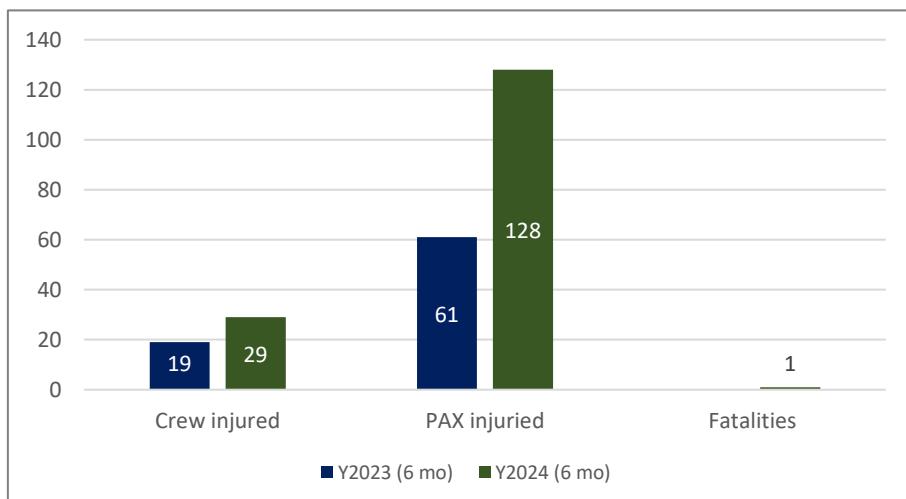


Figure 1 Comparative statistic for the first half of 2023 and 2024

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### **3. RECOMMENDED ACTIONS**

#### **3.1. Cabin Crews**

##### **3.1.1. Pre-flight preparation and safety briefing**

Pre-flight preparation: before each flight, during a pre-flight briefing with the flight crew the cabin crew should familiarize themselves with the weather forecasts and possible turbulence along the route. It is important that all cabin crew members are aware of the potential dangers and have an action plan.

Safety briefing: Inform passengers regularly about the need to keep their seat belts fastened throughout the flight. Pay special attention to explaining the importance of following this precaution, even in the absence of turbulence.

##### **3.1.2. Actions during turbulence**

Information exchange: When information about expected turbulence is received from the flight crew or is given by turning on the Seatbelt signs, the cabin crew must promptly transmit this information to passengers. Make sure that the safety measures are followed by passengers and remind them to fasten their seat belts.

Passenger control: Make sure that all passengers fasten their seat belts. Pay special attention to the passengers in the aisles and ensure their safety by ordering them to return to their seats immediately.

Service and safety: Stop food and drinks services, properly stow the trolleys in the galleys and make sure that all hand luggage is stored securely. After that, the cabin crew must take their seats and fasten their seat belts to ensure their own safety.

##### **3.1.3. Preventive measures**

Training and practical exercises: It is necessary to continuously improve theoretical and practical trainings on safety procedures during turbulence, including practicing actions in unexpected situations.

Equipment and systems: Check the serviceability of warning systems, seat belt signs and overhead bins' locks.

Information about incident: Use your airline's reporting system to provide information about incidents related to the turbulence during your flight. It is important to document the sequence of events and actions, as this will help your management further analyze and develop more effective safety measures.

#### **3.2. Investigation of turbulence related incidents**

This category of occurrence involves encounters with clear air, mountain wave, wave vortex, mechanical, and/or cloud-associated turbulence as well as turbulence encountered by aircraft when operating around or at buildings, structures and objects. A turbulence encounter is classified as an accident if:

- a) any passengers and/or crew members sustain fatal or serious injury as a result of turbulence; and/or
- b) the aircraft sustains damage or structural failure which meets ICAO's definition of an accident.

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The investigation of a turbulence encounter should reconstruct the sequence of events while focusing on the following aspects, in as much detail as possible:

a) pre-flight/in-flight activities — any activity (pre-flight and/or during the flight) related to minimizing the risk of injuries in the event of a turbulence encounter. These include information provided to passengers via the safety briefing card and the safety demonstration, and safety announcements throughout the flight;

b) pre-turbulence actions:

1) if/how and when the cabin crew were notified of turbulence (e.g. call from the flight deck, seat belt sign being illuminated) and the extent of information given to them (e.g. time remaining until the turbulence encounter, anticipated intensity, need to interrupt or delay service);

2) how the cabin crew prepared the passengers and the cabin once they were advised or became aware of anticipated turbulence, and how passengers responded;

3) tasks conducted by the cabin crew prior to/during the flight, which are related to minimizing the risk of injuries in the event of a turbulence encounter (e.g. securing service equipment); and

4) tasks conducted by the flight crew prior to/during the flight, which are related to minimizing the risk of injuries in the event of a turbulence encounter (e.g. announcements regarding the use of seat belts and use of the fasten seat belt signs);

c) during the turbulence encounter:

1) when the aircraft encountered turbulence (including time, phase of flight and flight level);

2) what activities were taking place in the cabin at the time (e.g. meal service, clean up, rest);

3) location of each cabin crew member at the time of the encounter, including their activities immediately prior to the turbulence;

4) whether the seat belt sign was illuminated at the time the aircraft encountered turbulence;

5) the location of passengers who were not in their seats when turbulence began;

6) what announcements were made regarding the turbulence;

7) cabin crew and passenger actions;

8) the functionality of systems and equipment used by cabin crew to assist in minimizing the risk of injuries or damage (e.g. how audible was the PA instructing occupants to take their seats?);

9) the effect of turbulence on occupants and their reactions (including injuries and difficulties experienced by occupants trying to restrain themselves);

10) the effect of turbulence on items in the cabin/galley/lavatory/other, including damage caused by loose items; and

11) the damage sustained by the aircraft/in the cabin; and

d) post-turbulence actions:

1) crew member and passenger actions; and

2) emergency response upon landing (e.g. medical services at the airport).

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As part of the investigation, it should be determined if the cabin crew members acted in accordance with their operator's policies, procedures and approved training programmes. This includes managing the cabin/passengers and interacting with other flight and cabin crew members. The CI should capture if the operator's policies and procedures were followed and if they were effective in the preparation of the cabin crew to respond appropriately to the situation.

Additionally, the cabin crew safety training programme content, particularly regarding turbulence management, should also be reviewed. Other sources of information such as operator records and any related documents may also be examined to determine contributing factors. For example, flight data recorder (FDR) data may be analysed to study the motions of the aircraft and to estimate the loads exerted on occupants during the turbulence upset.

**Additional information can be found in the Manual on the Investigation of Cabin Safety Aspects in Accidents and Incidents ICAO Doc 10062 Second edition, 2022.**