

Aviation Safety Analysis

Insights from data(1919 to 2023)





Introduction

There have always been opportunities and risks associated with aviation. Every choice has an immediate effect on safety, reputation, and profitability, whether it is selecting a certain model of aircraft, entering a new country, or collaborating with particular operators. However, these decisions are frequently taken without making the most of the abundance of historical data available.

Decades of aviation accident data are analysed in this presentation to identify trends, highlight the safest aircraft and areas, and offer evidence-based suggestions. The objective is to use historical data to get insights that assist companies in reducing risk and strengthening their long-term growth base.



Problem

Aircraft operators face significant safety, financial, and reputational risks when deciding which aircraft types to invest in.

Without clear, data-driven guidance, choices are often based on limited information or outdated assumptions. A single decision can lead to increased accidents, higher insurance costs, and reduced passenger trust.



Solution

Using historical accident and fatality data to guide aircraft selection and regional operations.

By using the data we get clear, objective insights on which aircraft types and regions carry the least risk.

Safer aircraft choices reduce liability, build passenger confidence, and position operators as industry leaders in safety and reliability.



Data

The "Aviation Accident" dataset provides a comprehensive record of aircraft accidents that occurred between the years 1919 and 2023. This dataset captures crucial details of each accident, including the date of the incident, registration number of the aircraft involved, the country where the accident occurred, the specific location, the category of the accident, and the number of fatalities.

(<https://www.kaggle.com/drealbash/aviation-accident-from-1919-2023?select=aviation-accident-data-2023-05-16.csv>)

Tools

Python (pandas, matplotlib, seaborn): For data cleaning, analysis, and visualization.

Tableau public: For visualization

Statistical Methods: Descriptive statistics and comparative analysis to identify trends and risk patterns.



Data Overview

The data comprises of 10 columns and 22581 entries. It covers a timespan of 1919 to 2023

Columns include:-

- Type
- registration
- Operator
- fatalities(total, ground and aircraft)
- location, country
- Accident_category
- year



Analysis Approach

Descriptive Statistics:

Measured accident frequencies and fatality rates across aircraft types, operators, and regions.

Comparative Analysis:

Compared safety outcomes by aircraft model, operator performance, and regional accident trends.

Trend Analysis:

Examined how accident numbers and severity have shifted over time, with a focus on the last 23 years to capture modern aviation patterns.



Key Findings

Safest aircraft types in last 20 years: Safest aircraft types in last 20 years: Cessna 208B Grand Caravan, Antonov An-2R, Beech 200 Super King Air, DHC-6 Twin Otter 300

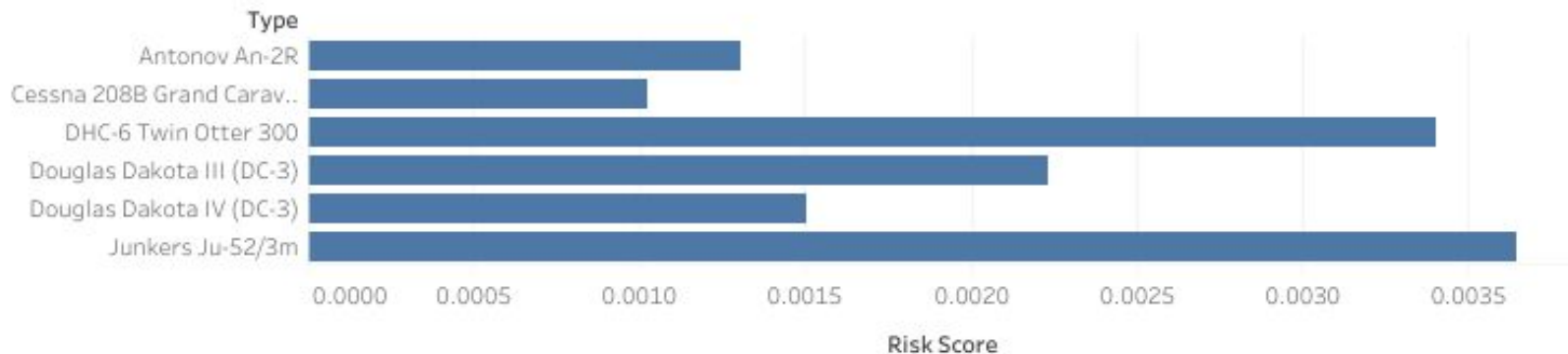
Low-risk regions: Belize, Maldives, Israel, Guyana and Uganda

Operators with consistently lower accident records: USAAF, USAF, RAF



Safest Aircraft Types

Safest Aircraft Types





Recommendations

- Focus on safer aircraft types with low or zero fatalities in last 20 years.
- Prioritize regions with historically lower accident rates.
- Avoid operators/aircraft categories with poor safety records.

