

Aviation Risk Analysis Project-Phase 1

...

By: Doris Mutie
September 3, 2025

Overview

This project analyzes aviation accident data from 1962 to 2023 to uncover safety trends and identify aircraft with the lowest risk profiles.

The goal is to provide data-driven insights that guide the company's strategic entry into the aviation industry, helping stakeholders make informed decisions about which aircraft to purchase and operate for commercial and private purposes.

Problem Statement

The company plans to expand into the aviation industry by purchasing and operating aircraft for commercial and private use but lacks sufficient insight into aviation safety risks. Without a data-driven understanding of past accidents, the company could invest in high-risk aircraft, leading to financial losses, operational issues, or regulatory challenges. Analyzing historical incidents will help identify safer aircraft and guide strategic decisions.

Objectives:

1. Identify aircraft with lowest accident/fatality rates
2. Analyze accident trends over time
3. Determine top contributing risk factors
4. Provide actionable recommendations for safe investment

Data Understanding

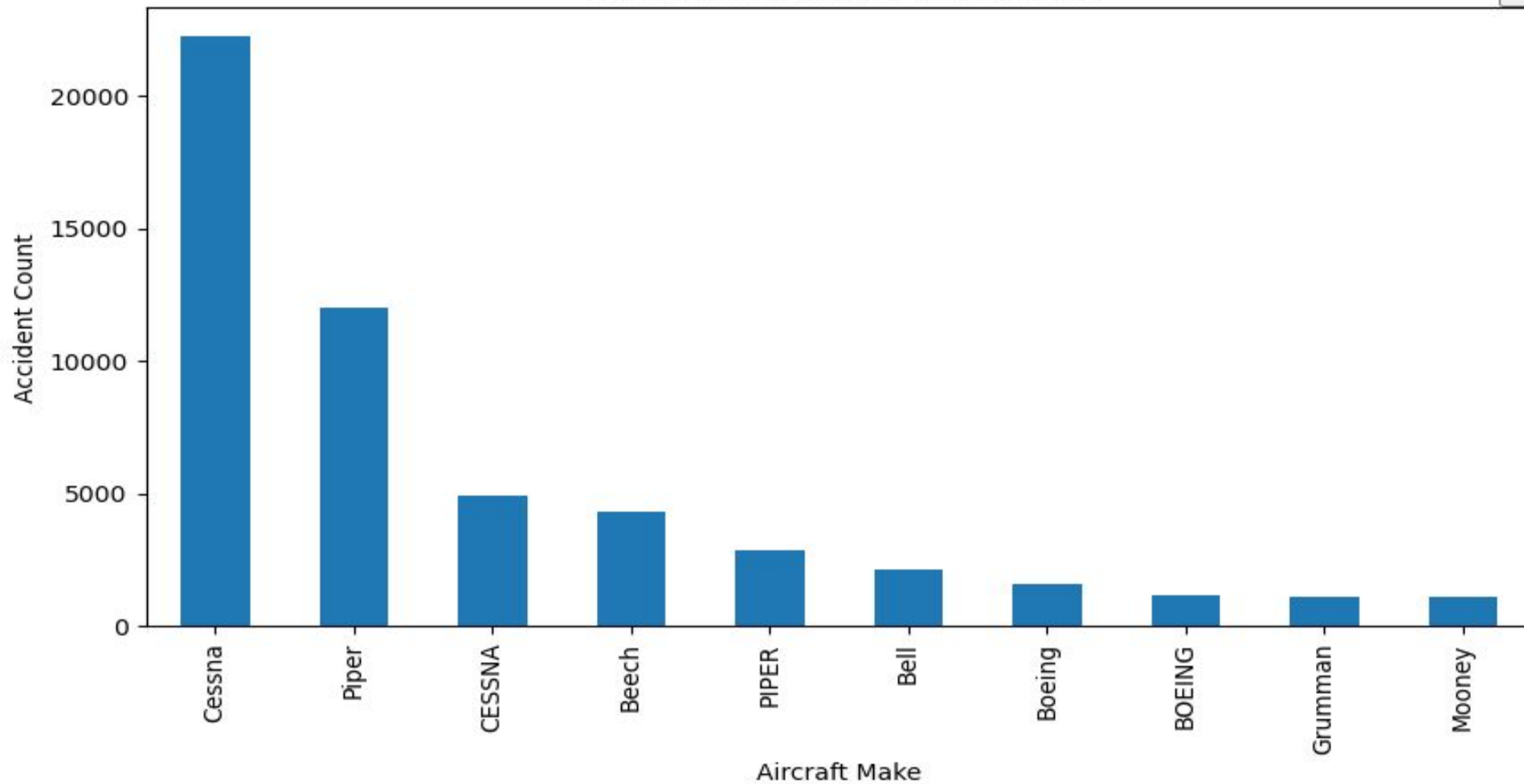
The dataset used for this analysis comes from the National Transportation Safety Board (NTSB) and covers aviation accidents and incidents from 1962 to 2023, totaling over 90,000 records. Key columns include Event Date, Aircraft Type, Make, Model, Location, Injury Severity, Purpose of Flight, Weather Conditions, and Probable Cause. Data cleaning involved handling missing values, correcting data types, and removing duplicate entries to ensure accuracy and reliability for analysis.

Data Analysis

Top 10 Aircraft Makes in Accidents

Cessna and Piper aircraft account for the highest number of accidents, showing which makes carry greater historical risks.

Top 10 Aircraft Makes in Accidents

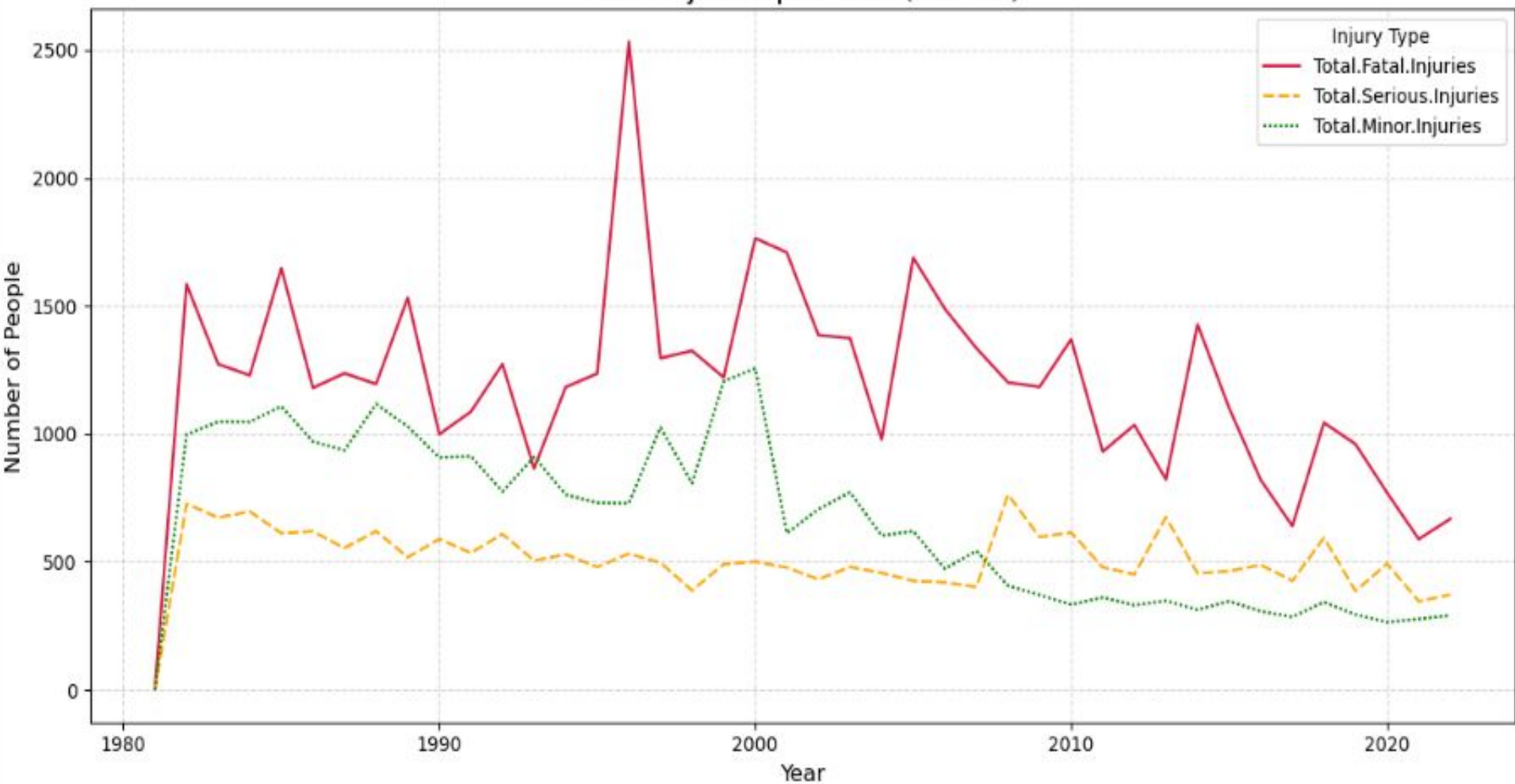


Data Analysis

Total Injuries per Year (1980+)

Injuries have generally declined since the 1990s, but fatal accidents remain a significant concern over time.

Total Injuries per Year (1980+)

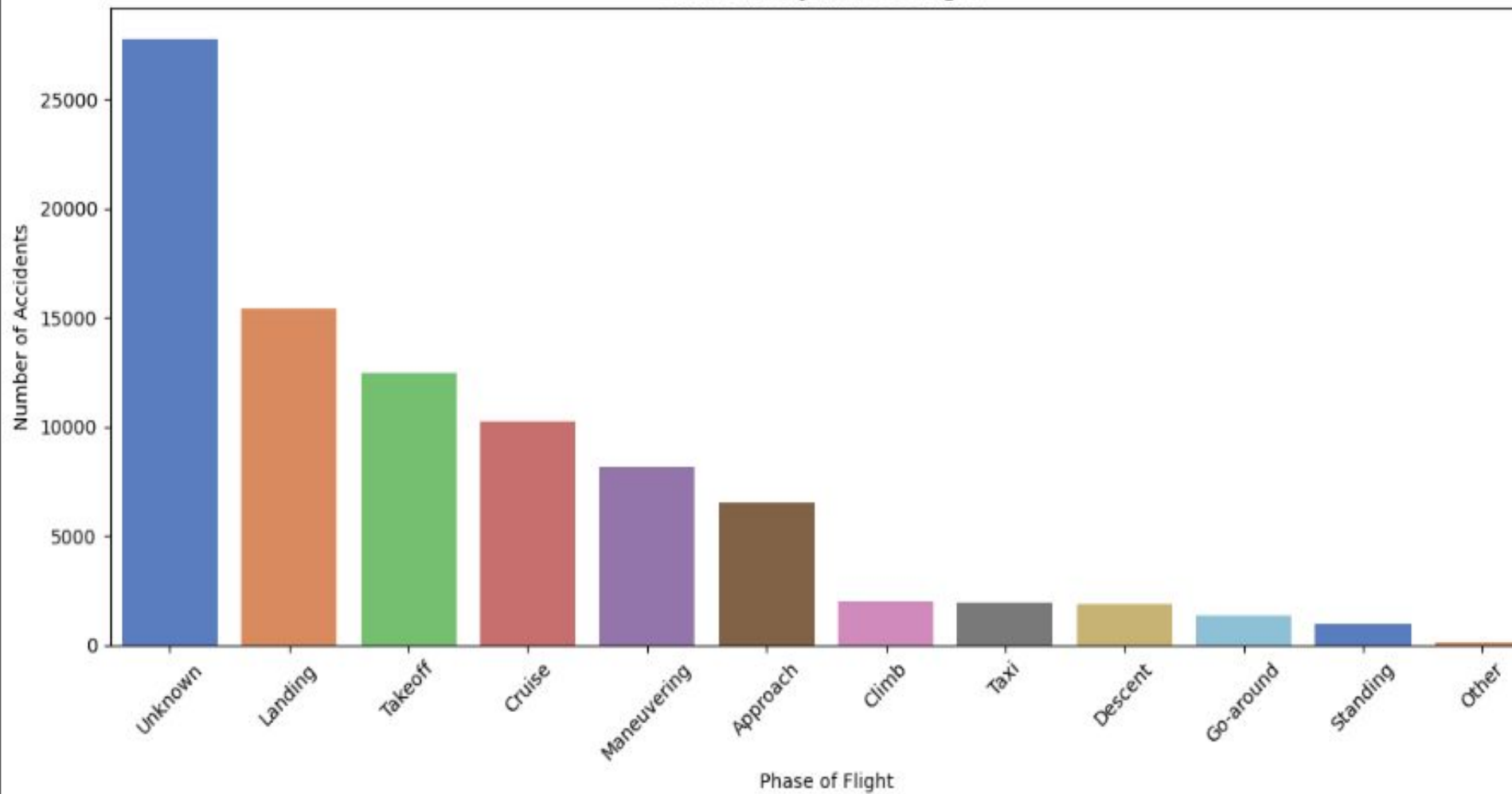


Data Analysis

Accidents by Phase of Flight

Most accidents occur during landing, takeoff, and cruise, making these the riskiest stages of flight operations .

Accidents by Phase of Flight



Recommendations

- Prioritize aircraft with low accident and fatality rates
- Avoid purchasing high-risk aircraft types
- Focus on safer regions and commercial operations
- Strengthen pilot training, maintenance, and weather preparedness

Next Steps:

- Collect detailed flight-hour and maintenance data for precise risk modeling
- Integrate real-time aviation data for ongoing monitoring
- Build predictive models to forecast aircraft risk by type and region
- Deploy an interactive Tableau dashboard for live updates

Thankyou

Question?