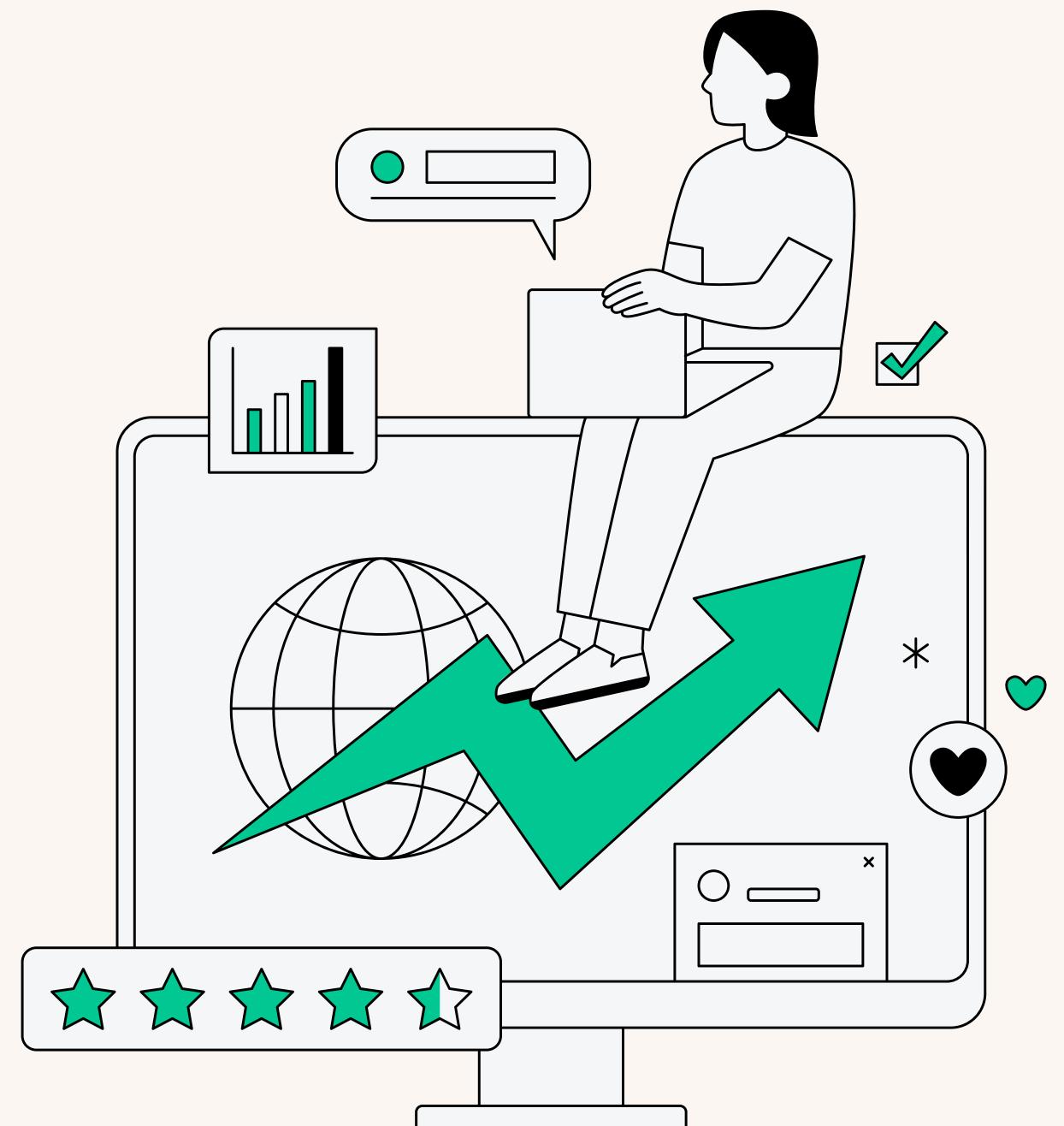


Aircraft Risk Analysis

Data-Driven Insights for Aviation Business Decisions

Presented by Gloria Ngure

June 7th 2024



Outline

1. Overview
2. Business Understanding
3. Data Understanding
4. Data Analysis
5. Visualizations
6. Conclusion
7. Recommendations
8. Next Steps

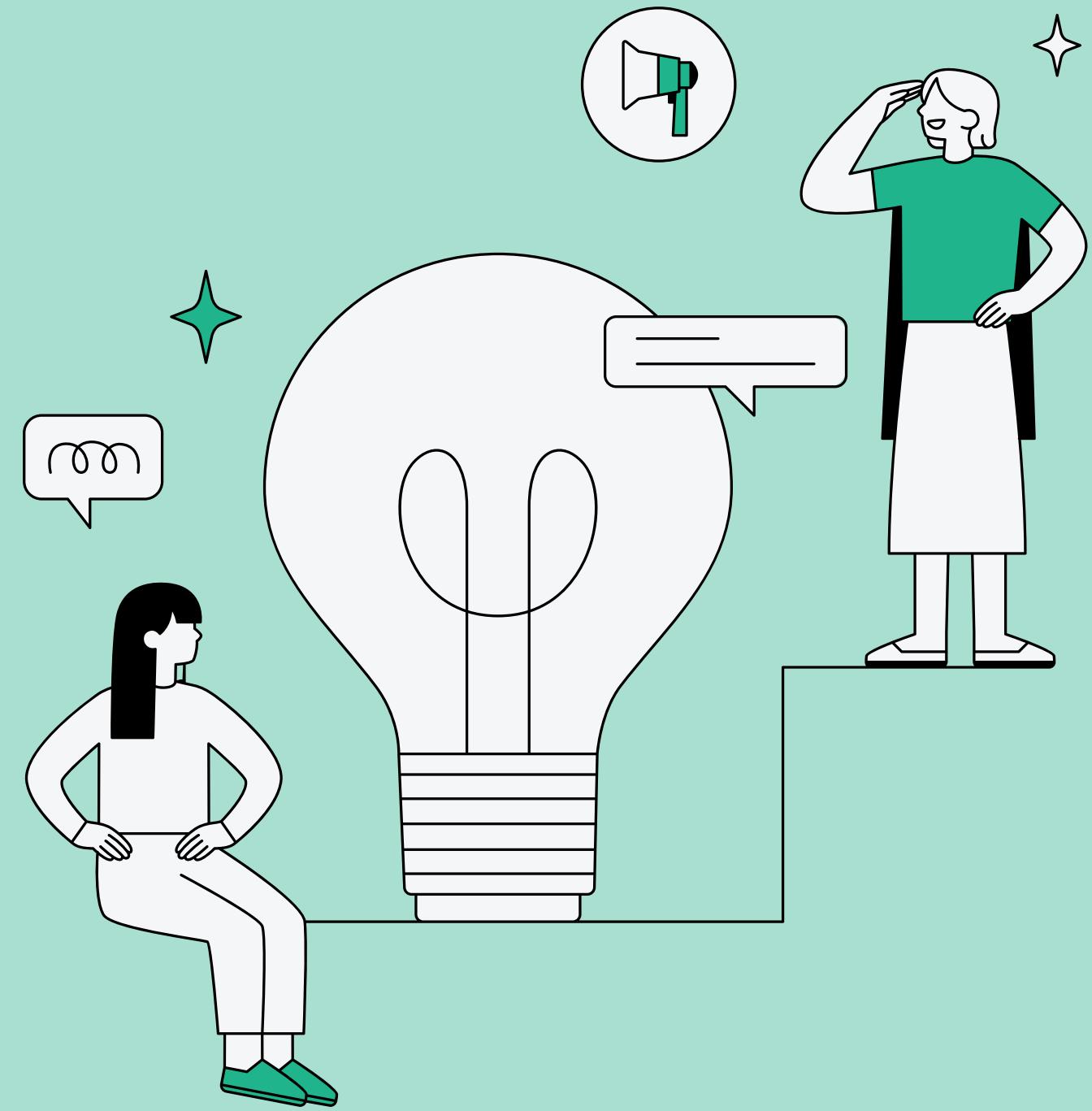
Overview

Objective

To identify low-risk aircraft types to inform the company's entry into the aviation industry.

Approach

Data analysis and visualization using historical aviation accident data from the National Transportation Safety Board (NTSB).



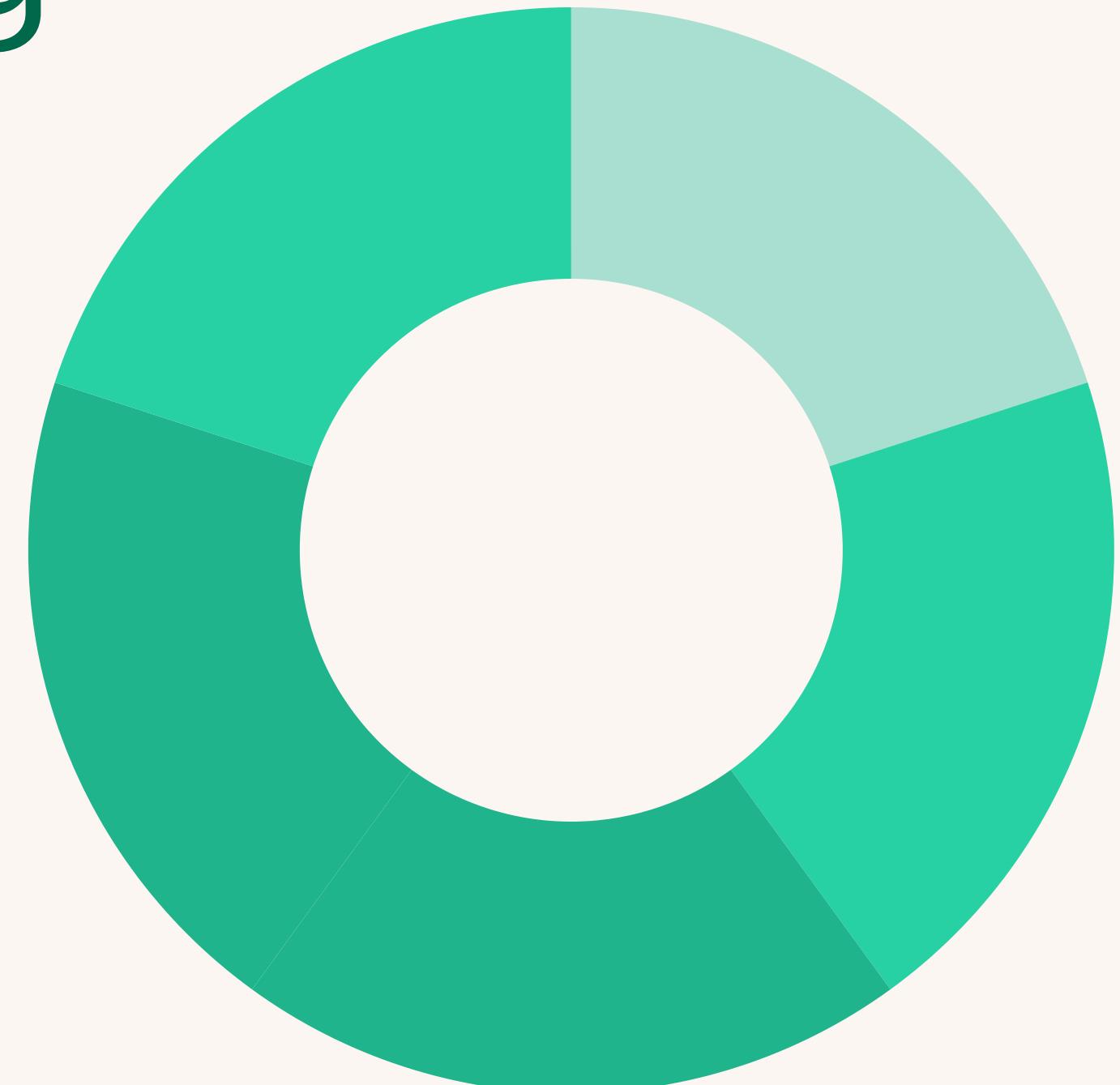
Business Understanding

Stakeholders

Head of the new aviation division.

Key Business Questions

1. Which aircraft types are associated with the lowest risk of accidents?
2. What are the common factors contributing to aviation accidents?
3. How can the company minimize risks when selecting aircraft for purchase?





Data Understanding

Source of Data: National Transportation Safety Board (NTSB).

Data Coverage: Aviation accident data from 1948 to 2022.

Features:

- Aircraft Type - The make and model of the aircraft.
- Weather Conditions - Conditions during the accident (VMC and IMC).
- Broad Phase of Flight - The phase of flight during the accident.
- Engine Type: -Type of engine used.
- Number of Engines - Total engines in the aircraft.
- Aircraft Damage - Extent of damage to the aircraft.
- Total Fatal Injuries - Number of fatal injuries.
- Total Serious Injuries - Number of serious injuries.
- Total Minor Injuries - Number of minor injuries.



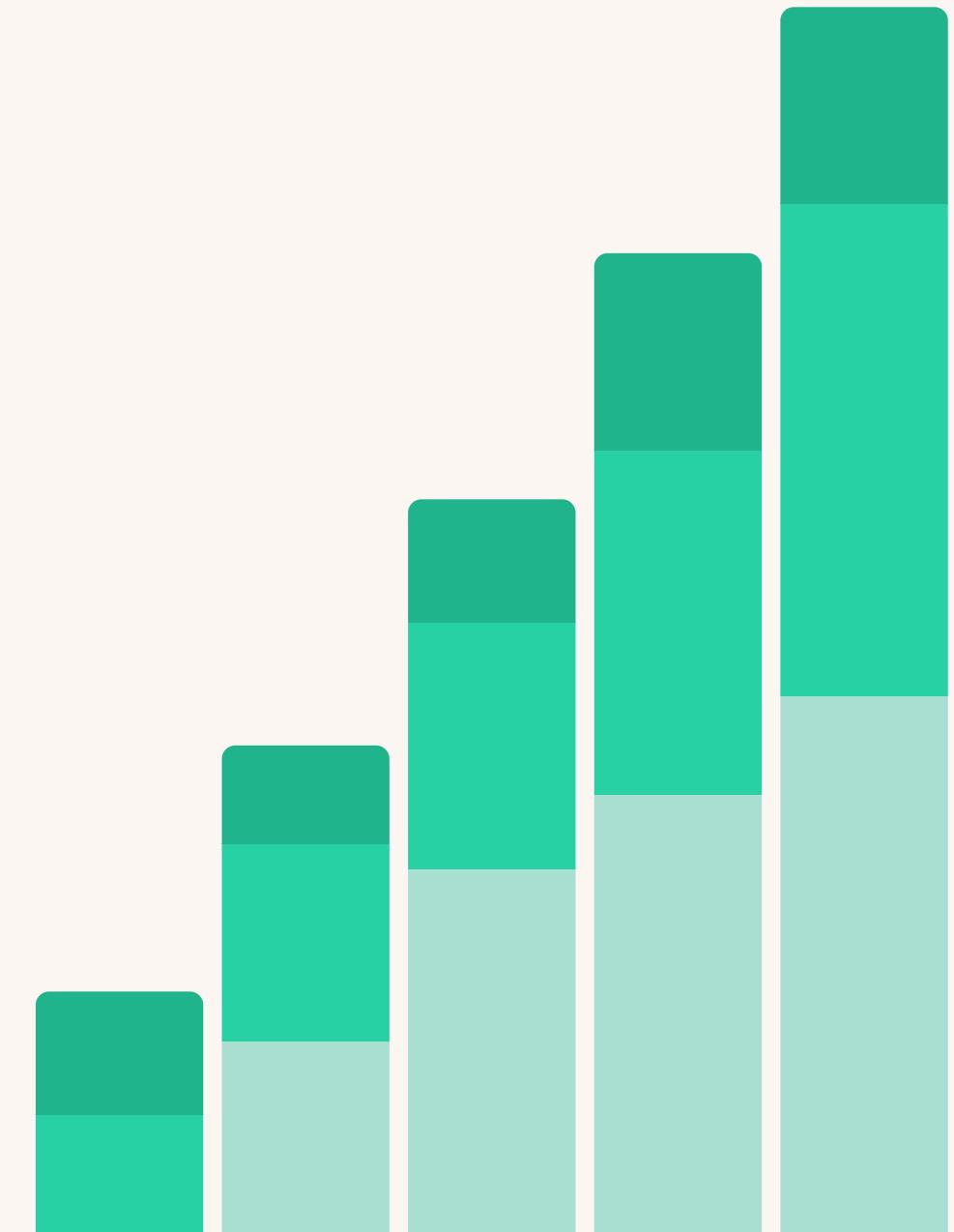
Data Analysis

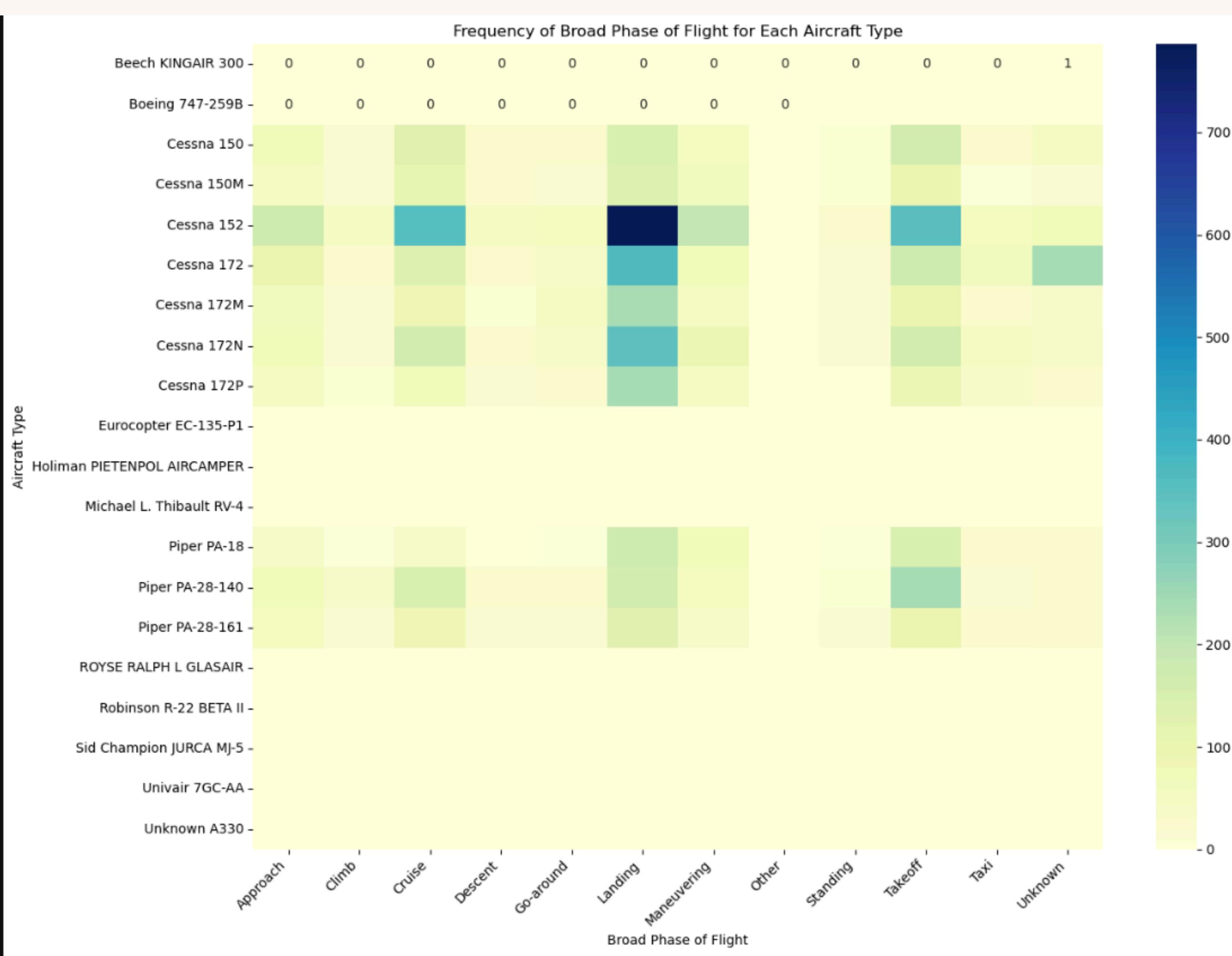
Analysis Techniques

Data cleaning, imputation, aggregation, and visualization.

Visualizations

- Heatmap showing the frequency of broad phase of flight for each aircraft type.
- Stacked bar chart showing frequency distribution of engine types for top aircraft types.
- Bar chart showing severity analysis by aircraft type.
-

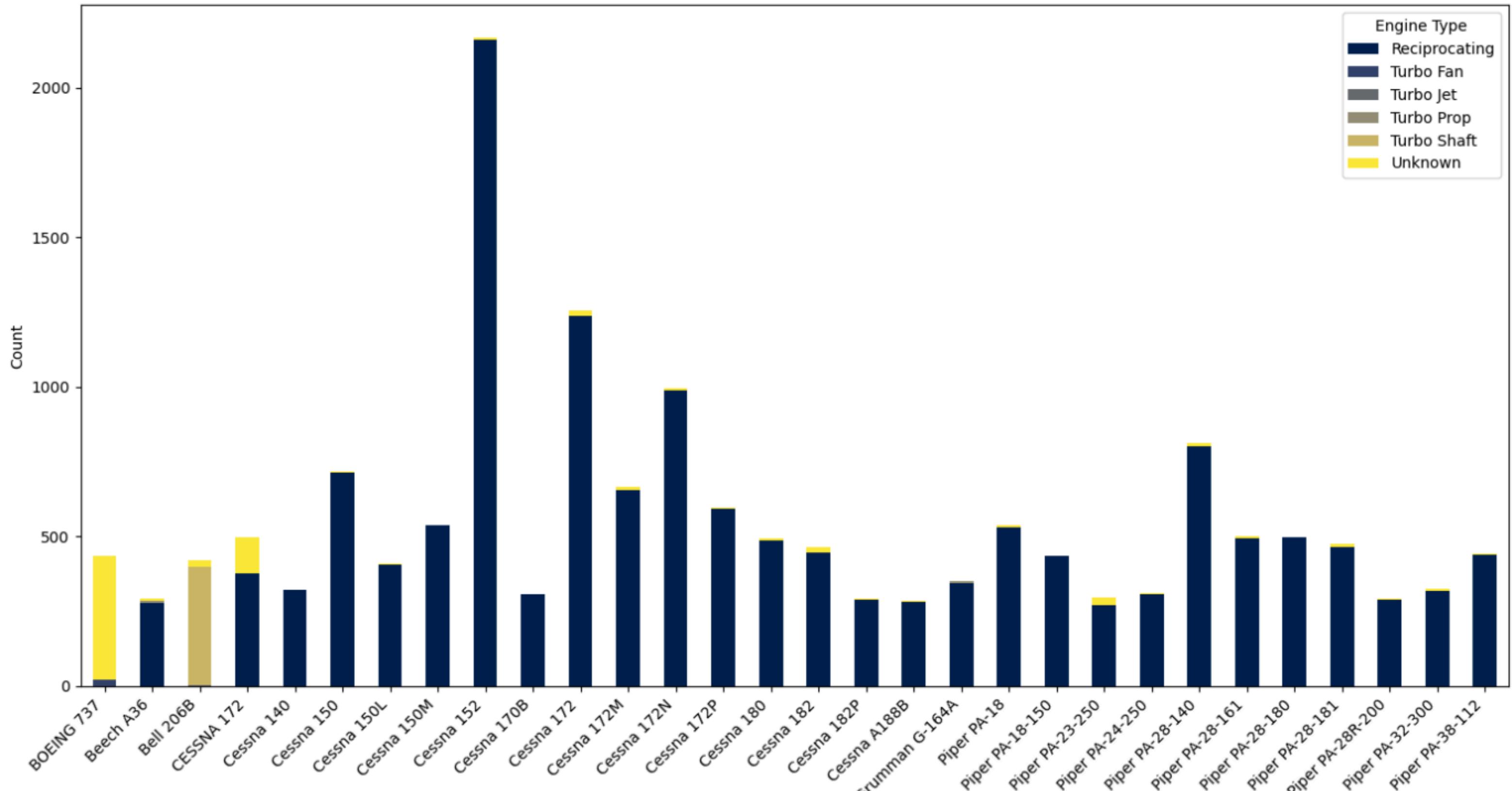




Highlights accident-prone phases for different aircraft types.

The intensity of the color indicates the number of occurrences, helping identify which phases are most accident-prone for each aircraft type.

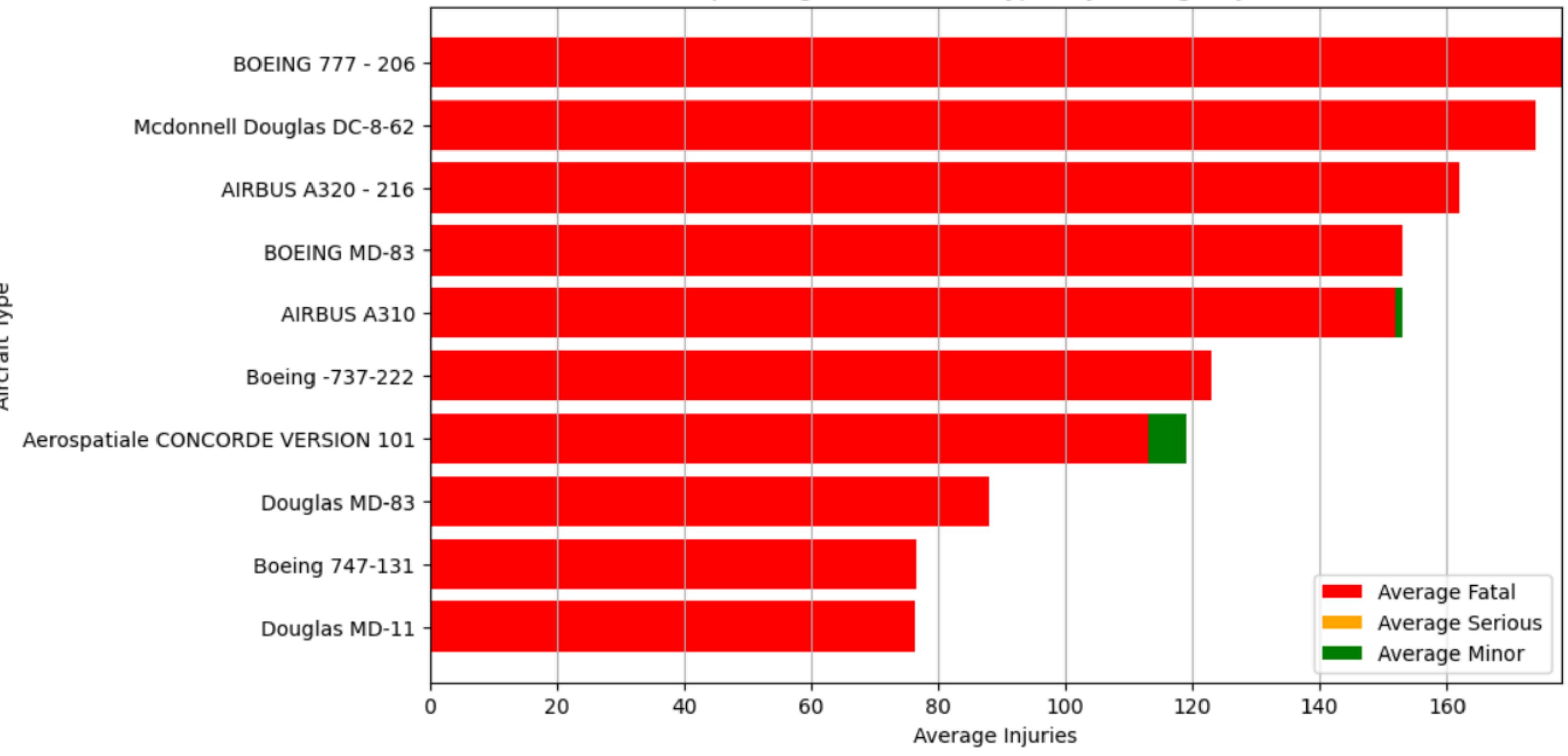
Frequency Distribution of Engine Types for Top 10 Aircraft Types



It highlights the prevalence of certain engine types in aircraft that are frequently involved in accidents.

Shows prevalent engine types in frequently involved aircraft accidents.

Top 10 High-Risk Aircraft Types by Average Injuries



Provides insights into the severity of accidents for different aircraft types.

This bar chart displays the average number of fatal, serious, and minor injuries for different aircraft types. It provides insights into the severity of accidents associated with each aircraft type.

Conclusion

Low-Risk Aircraft Types

Aircraft types with fewer occurrences in the dataset tend to be lower risk. This could be due to fewer flights or inherently safer designs.

Common Contributing Factors

Certain phases of flight, such as takeoff and landing, are more prone to accidents. Weather conditions also play a significant role, with IMC associated with higher accident rates.



Recommendations

01.

Select Low-Risk Aircraft

Focus on aircraft types with fewer occurrences in the dataset.

02.

Consider Common Contributing Factors

Pay attention to phases of flight and weather conditions associated with higher risks.

03.

Choose Reliable Engine Types

Prioritize aircraft with engine types that show lower accident rates.

Next Steps

Further Analysis - Explore additional factors influencing aviation safety.

Pilot Programs - Conduct pilot programs with selected low-risk aircraft.

Continuous Monitoring - Implement continuous monitoring of aircraft performance and safety.

Presented by Gloria Ngure

Thank you very much!

For any enquiries I can be reached on:

Email: glongure@gmail.com

