AVIATION RISK ANALYSIS

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INTRODUCTION

PROBLEM

A company is interested in purchasing and operating airplanes for commercial and private enterprises, but do not know anything about the potential risks of aircrafts.

SOLUTION

Conduct an analysis to determine which aircrafts are the lowest risk for the company to start this new business endeavor. Give three business recommendations from the insights provided to help the shareholders make a better decision

DASHBOARD LINK:

https://public.tableau.com/app/profile/grace.wangui6459/viz/AviationRiskAnalysisProject/AVIATIONRISKANALYSISDASHBOARD

DATA SOURCE:

Kaggle Dataset

BUSINESS UNDERSTANDING

- Aviation safety directly impacts operational cost, reliability, and brand trust.
- This analysis focuses on identifying key safety trends to guide decisions

Key Business Questions:

- Which aircraft manufacturers and models show the strongest safety records?
- During which flight phases do most injuries occur, and how can risks be reduced
- How have aviation safety outcomes evolved over time?

DATA UNDERSTANDING

The dataset initially contained 90,348 entries of aviation accidents and incidents, including details such as:

- Aircraft make and model
- Date and location of event
- Phase of flight
- Injury severity of the people travelling(fatal, serious, minor, uninjured)

<u>After cleaning and preparation of the dataset:</u>

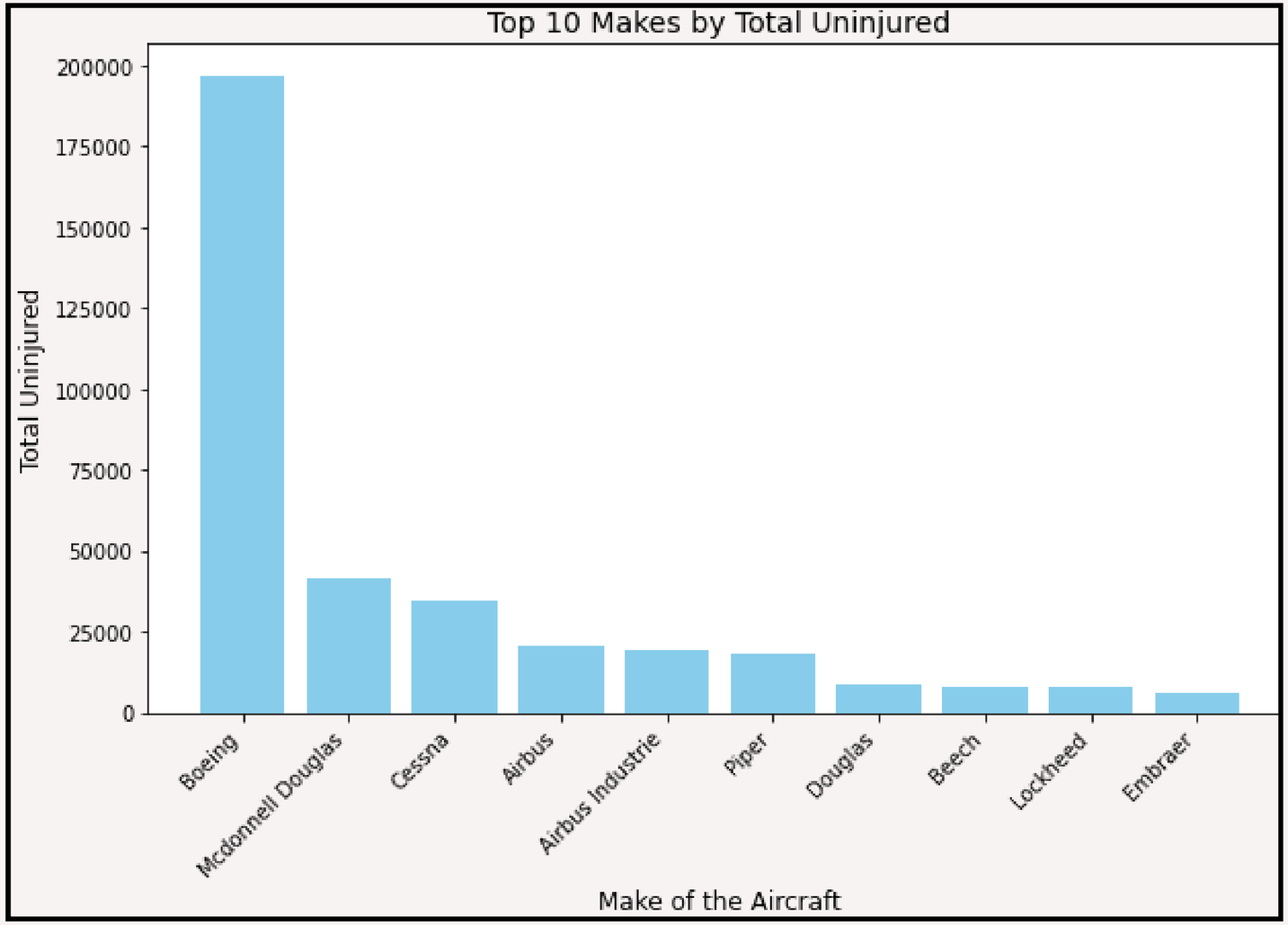
- The entries reduced to 87,951 after removing duplicates and missing records

- Missing values were imputed with median for numeric columns; categorical columns were standardized and filled with "Missing" or "Unknown" as appropriate.

<u>Technologies Used:</u>

- Python – data cleaning and analysis
- Pandas & NumPy – data preparation and transformation
- Tableau – visualization and dashboard creation
- Jupyter Notebook – documentation and reproducible workflow

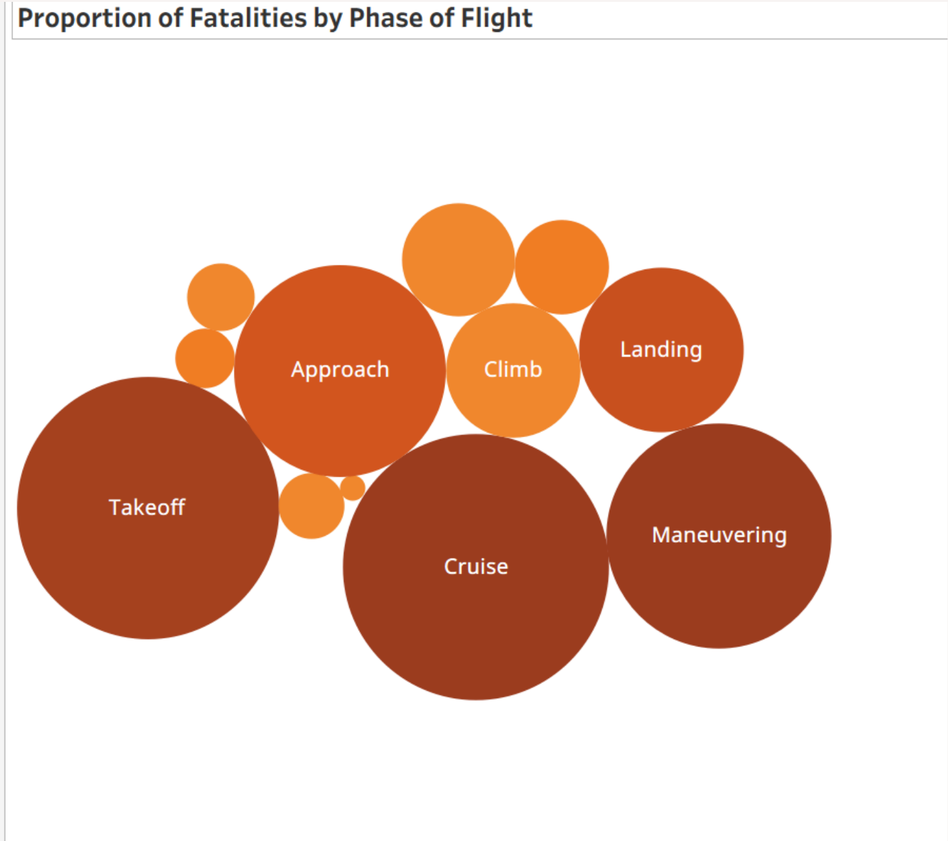
FINDINGS



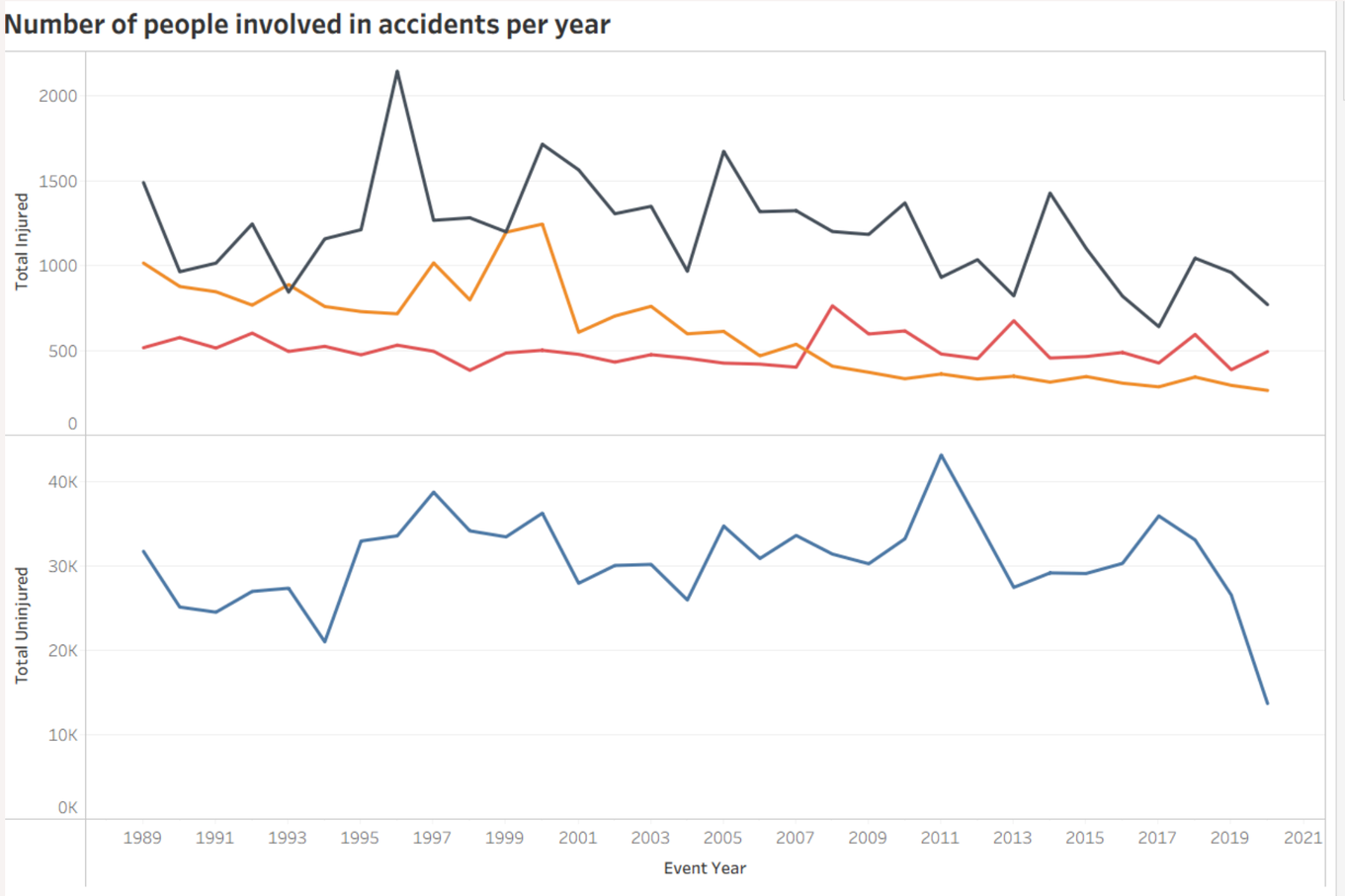
- ***Boeing*** *aircraft showed the best safety performance based on uninjured passenger counts.*
- *This suggests Boeing planes are a lower-risk option for the company's entry into the aviation industry.*

FINDINGS

- **Takeoff** , **Manuevering** and **Cruise** phases are the most accident-prone stages of flight.



- **A steady decline in injuries** over the past decades demonstrates significant **improvement in aviation safety standards.**



RECOMMENDATIONS FOR THE BUSINESS

Based on the insights, the following recommendations are proposed:

1. **Fleet Selection:**
Prioritize aircraft models from manufacturers with consistently strong safety performance (e.g., **Boeing**) when building the fleet.

2. **Pilot Training and Procedures:**
Implement enhanced training programs focused on **takeoff, cruise, and maneuvering** phases, where the majority of injuries occur.

3. **Maintenance and Safety Monitoring:**
Invest in proactive maintenance and risk monitoring systems to minimize the likelihood of incidents during critical flight stages.

4. **Data-Driven Safety Strategy:**
Continue collecting and analyzing flight and maintenance data to track safety metrics and inform continuous improvement.

LIMITATIONS

- **Data Gaps**: Some incidents were underreported or lacked complete injury/cause details.
- **Inconsistent Classification**: Accident definitions and reporting standards vary by country and agency.
- **Time Lag**: Older records may not reflect recent safety improvements or newer aircraft technology.
- **Missing Operational Context**: Limited information on crew experience, maintenance history, and weather specifics.
- **Scope**: Analysis focuses on reported accidents only — near-misses and maintenance events were not included

THANK YOU

I welcome any question from the analysis.

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