



Aviation Accident Severity Analysis

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01 INTRODUCTION

1.1 Overview

- This project analyzes aviation accident severity using historical accident records.
- The goal is to understand what factors increase the impact of accidents, not just how often they occur.
- Insights are used to support better safety prioritization for aviation stakeholders.



1.2 Business Understanding

Business Problem

- Aviation safety efforts have reduced accident frequency, but severe accidents still occur.
- Stakeholders need to know:
 - Whether engine configuration affects outcomes.
 - How flight purpose and weather influence severity.
 - Which aircraft model pose minimal risk?





02 DATA ANALYSIS

2.1 Data Source

- National aviation accident records spanning multiple decades
- Over 90,000 accident records before cleaning

Key Information Used

- Aircraft make and model
- Number of engines
- Purpose of flight
- Weather condition
- Injury outcomes (fatal, serious, minor, uninjured)
- Accident date





2.2 Data Cleaning & Preparation

How the data was prepared:

- Removed irrelevant columns to focus on safety drivers
- Standardized text fields (e.g., aircraft make, weather)
- Handled missing values:
 - Injury counts filled with zero when missing
 - Records missing key aircraft or weather information were removed
- Filtered data to 1985 onward to ensure modern relevance

Result

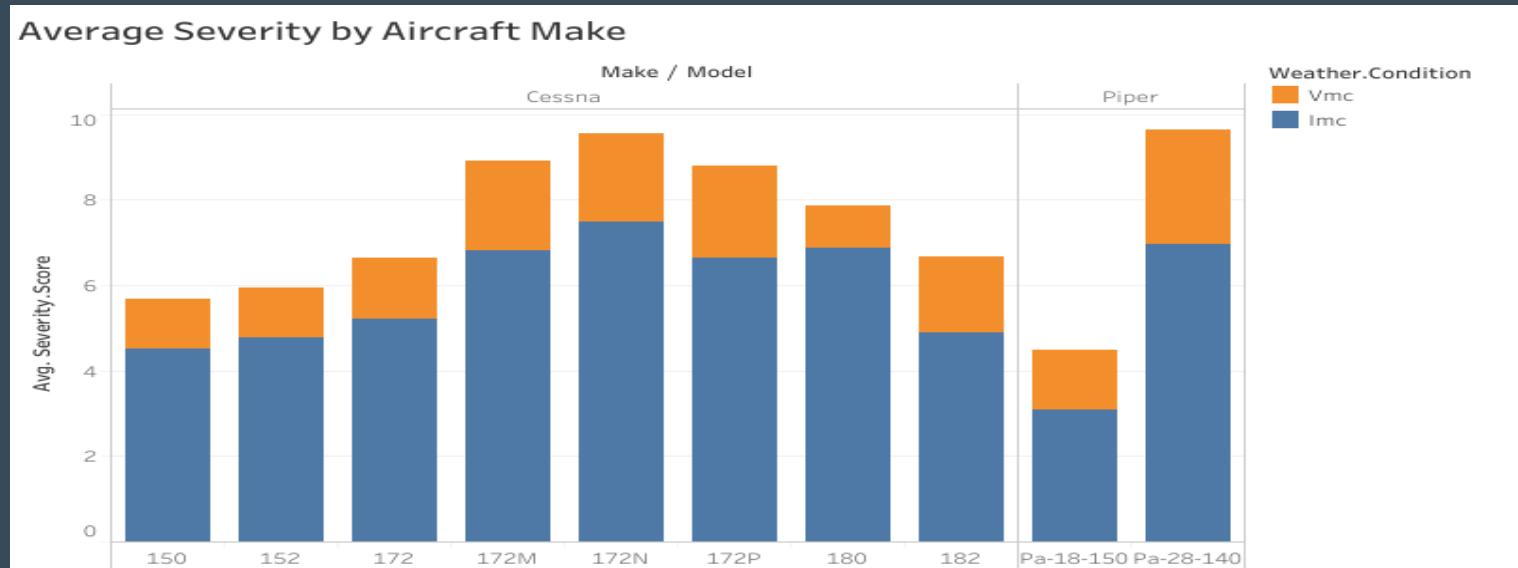
- Final dataset: 8,412 clean, high-quality accident records



RESULTS



Average Severity by Aircraft Make/Model



Key Insight:

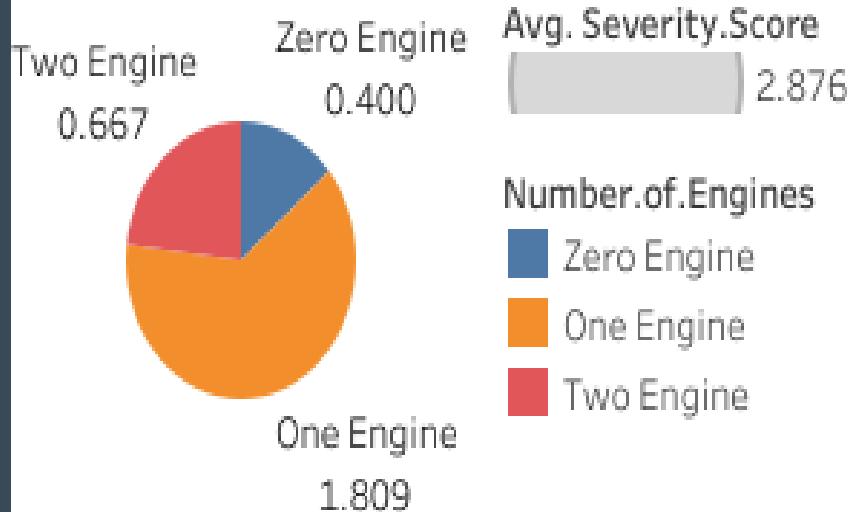
- Accident severity varies significantly by aircraft model, even within the same manufacturer.
- Not all popular aircraft are equally safe when accidents occur.





Severity By Engine Count

Severity by Engine Count



Key Insight

Single-engine aircraft are associated with higher accident severity.

Why This Happens?

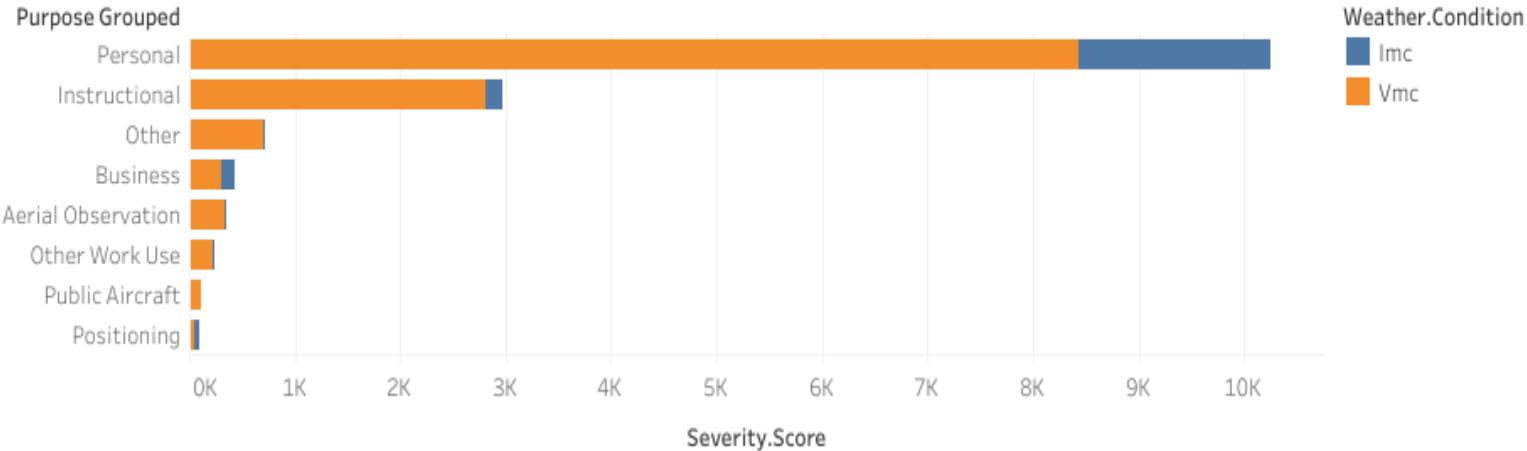
- No redundancy in the event of engine failure
- Limited recovery options in emergencies



Purpose of Flight & Risk



Purpose of Flight vs Average Severity



Key Insight

Personal and instructional flights account for the highest severity exposure.

Non-commercial operations may:

- Have looser safety controls
- Involve less experienced pilots
- Operate under higher-risk conditions



04 Recommendations & Next Steps



Recommendations

1. Prioritize safety monitoring, inspections, and pilot training for aircraft models associated with higher severity outcomes.
2. Avoid single-engine aircraft
3. Focus safety initiatives on airplanes used for private purposes.





Next Steps

Opportunities for Future Analysis:

- Pilot experience and certification
- Phase of flight (takeoff, landing, cruise)
- Cost and economic impact of accidents
- Predictive risk scoring models





THANK YOU

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