



Aviation Accident Severity Analysis

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TABLE OF CONTENTS

01

INTRODUCTION

Understand what the project is all about.

02

DATA ANALYSIS

Describe the data used for analysis and methodology.

03

RESULTS

Describe the results of analysis using visuals.

04

RECOMMENDATION

Recommend the necessary actions and next steps.



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

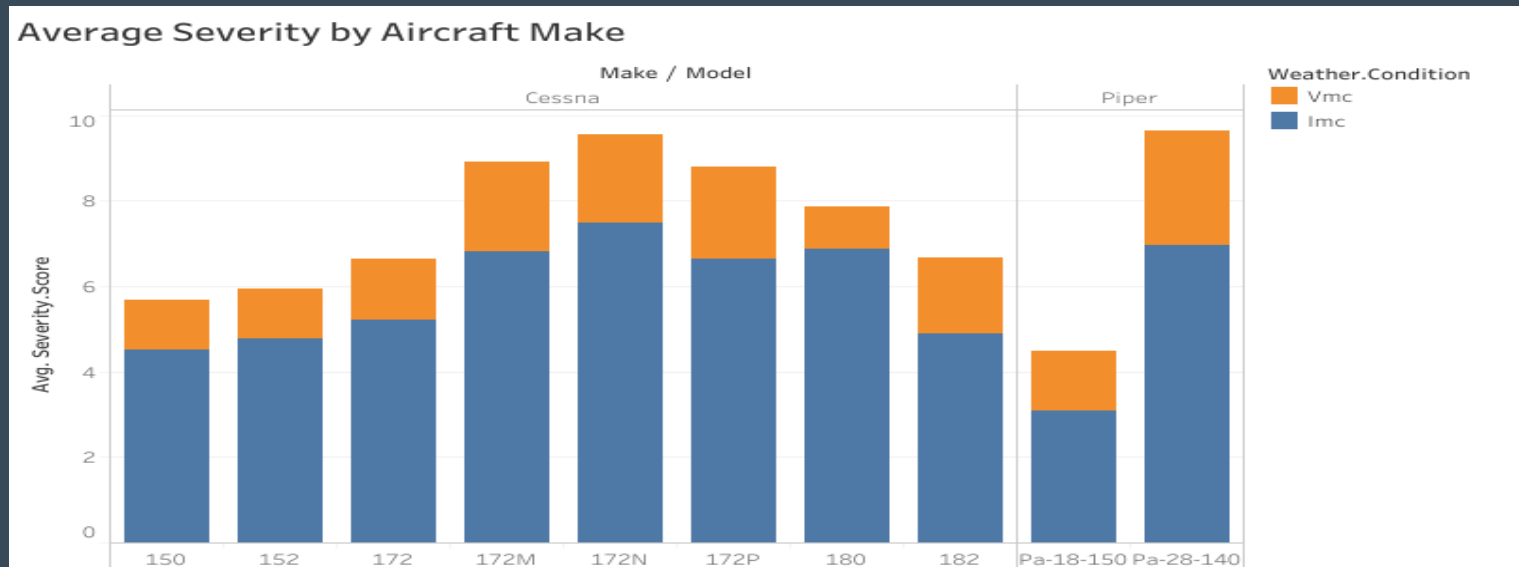
- Final dataset: 8,412 clean, high-quality accident records



RESULTS



Average Severity by Aircraft Make/Model)



Key Insight:

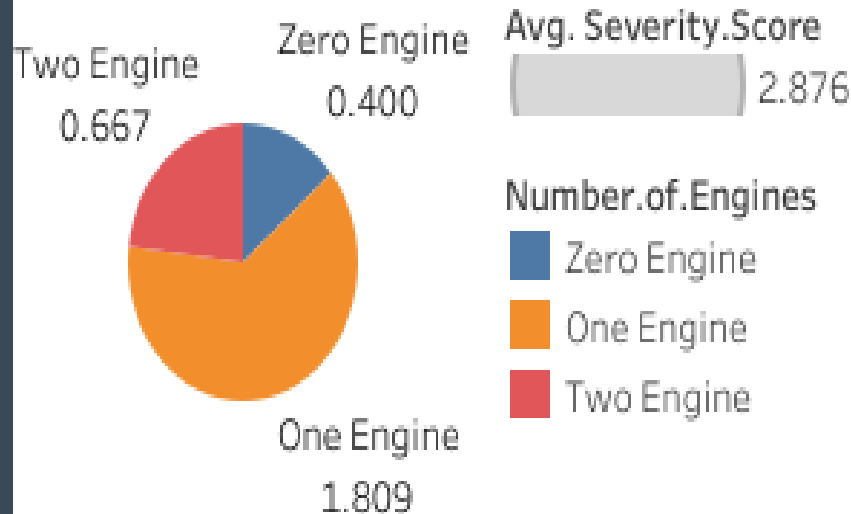
- Accident severity varies significantly by aircraft model, even within the same manufacturer.
- Not all popular aircraft are equally safe when accidents occur.





Severity By Engine Count

Severity by Engine Count



Key Insight

Single-engine aircraft are associated with higher accident severity.

Why This Happens?

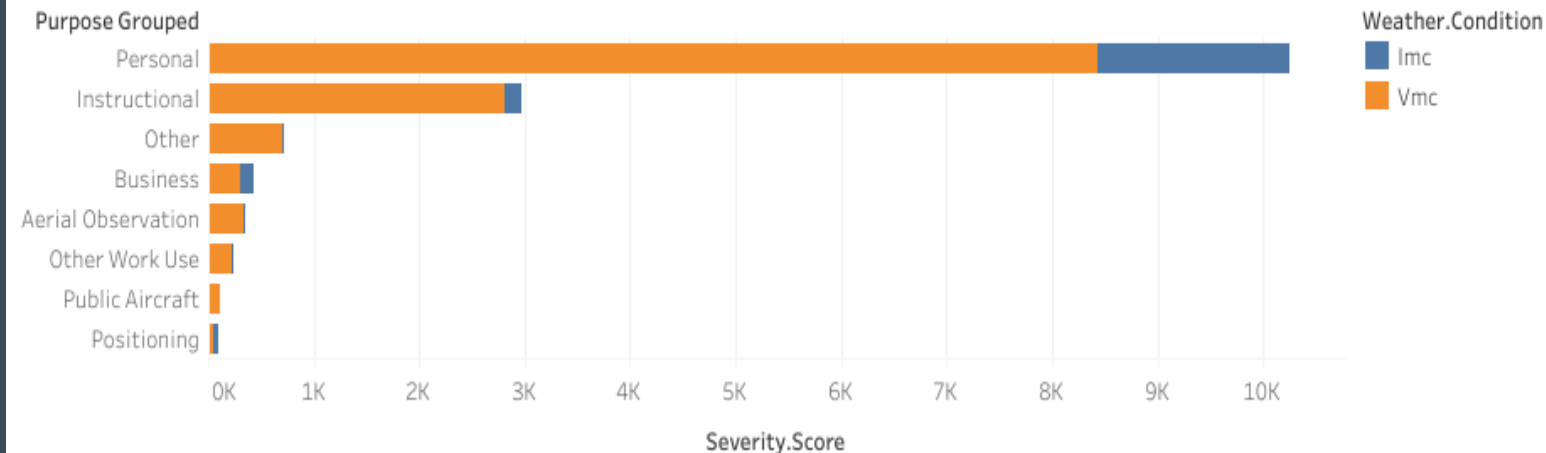
- No redundancy in the event of engine failure
- Limited recovery options in emergencies



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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