AVIATION RISK ANALYSIS

Data-Driven Recommendation for Safe Aircraft Acquisition

Project Overview

- **Objective:** Identify low-risk aircraft to support company's aviation expansion
- Analyze aviation accident data (1962–2023)
- Use data cleaning, aggregation, and visualization for business insights

Business Problem

- Company entering the aviation industry
- Guidance needed on safest aircraft and conditions to operate
- Lack of internal experience in aviation safety

Data Summary

Source

- National Transportation Safety Board (NTSB)
- Contains civil aviation accident data (U.S. and international waters)
- Duration 1962 to 2023

Key Variables

- Aircraft make/model
- Flight phase
- Flight purpose
- Weather condition
- Injury counts (fatal, serious, minor)

Data Cleaning & Preparation

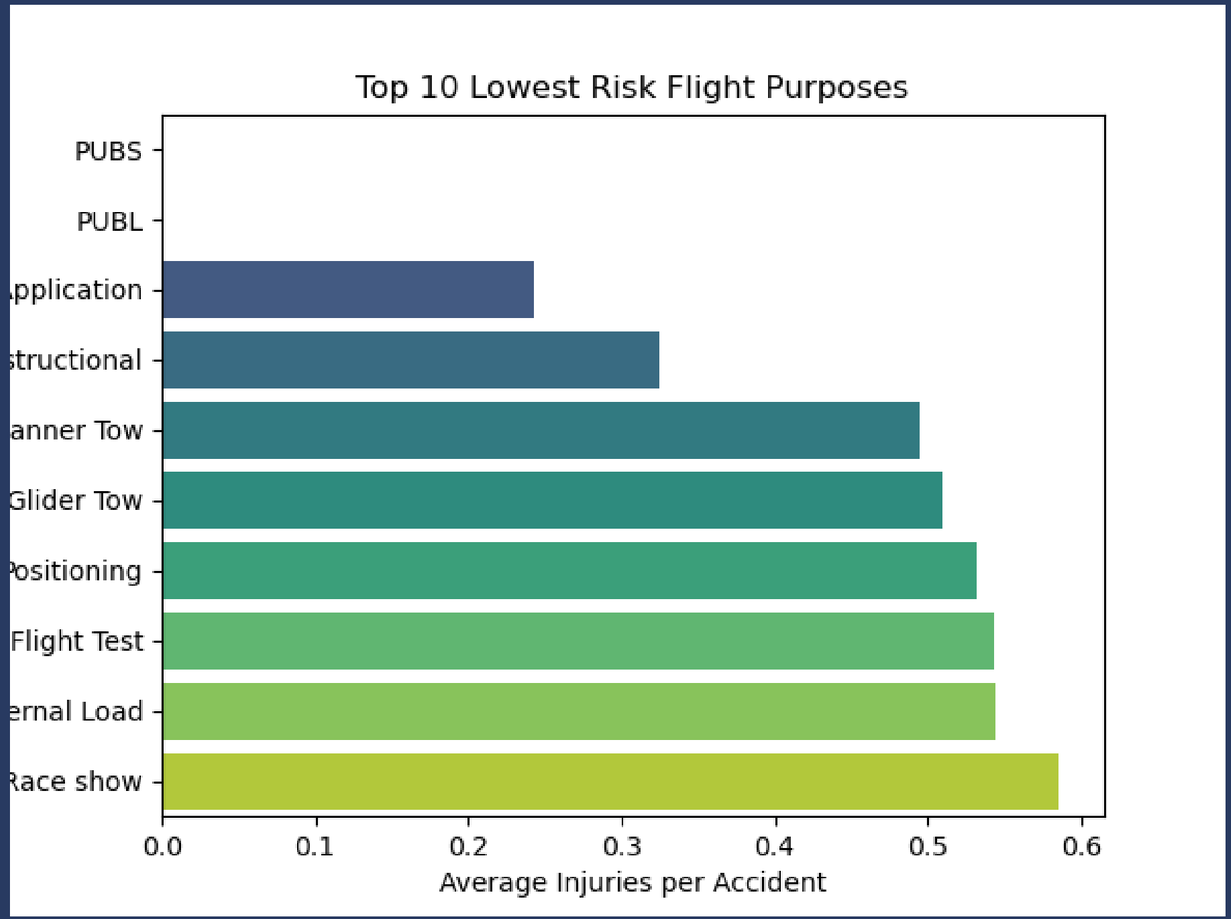
- Standardized date fields (i.e., Event Date)
- Computed total injuries per event
- Filled missing values for flight purpose, phase, weather, and aircraft fields
- Created Make-Model identifier for aggregation
- Filtered out records with insufficient data for meaningful analysis

Risk Analysis

- Risk by Flight Purpose
- Risk by Flight Phase
- Risk by Weather Condition Impact
- Aircraft Model Risk – Most Accidents
- Aircraft Model Risk – Least Accidents

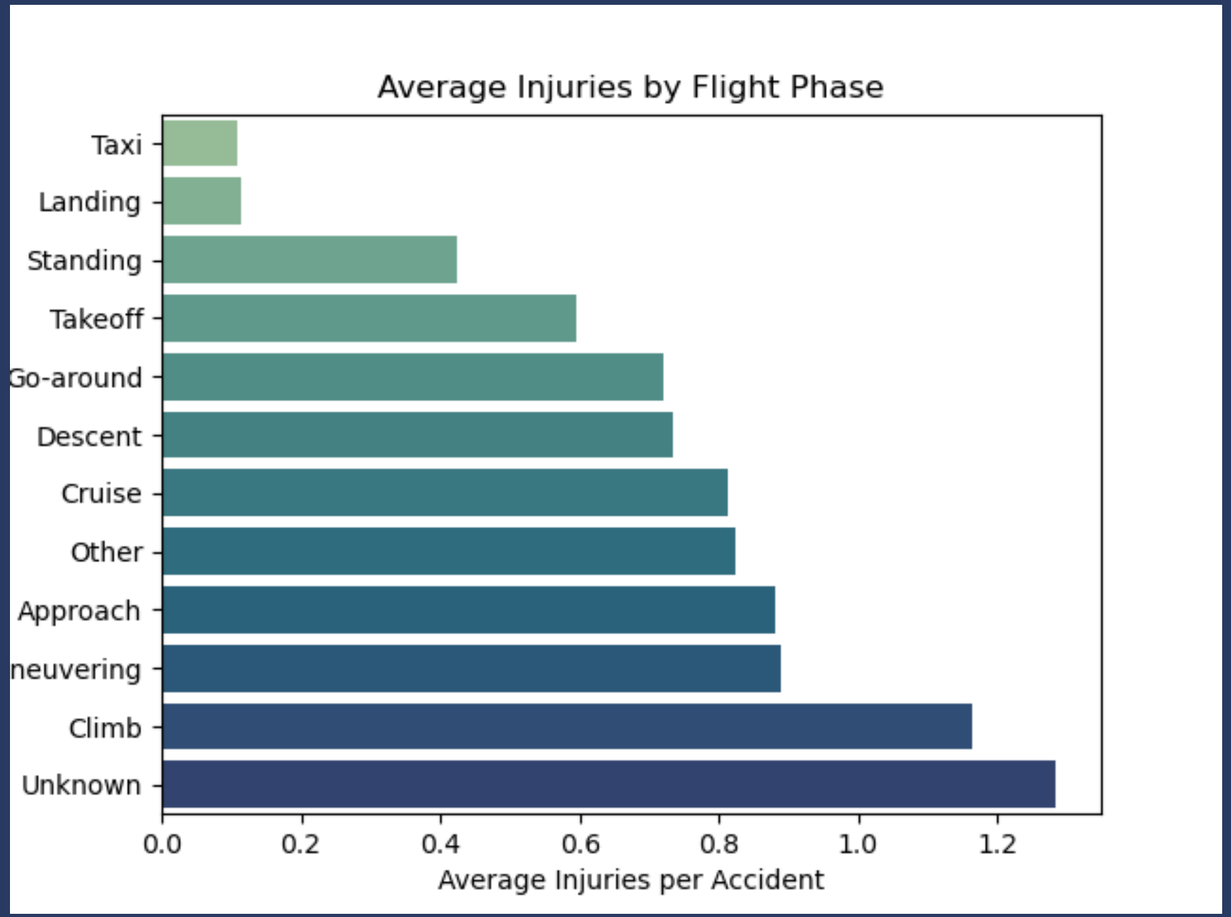
Risk by Flight Purpose

- **Lowest Risk:** Aerial Application, Banner Towing, Glider Towing
- **Highest Risk:** Executive/Corporate, Skydiving
- **Recommendation:** Focus on low-risk flight purposes for initial operations



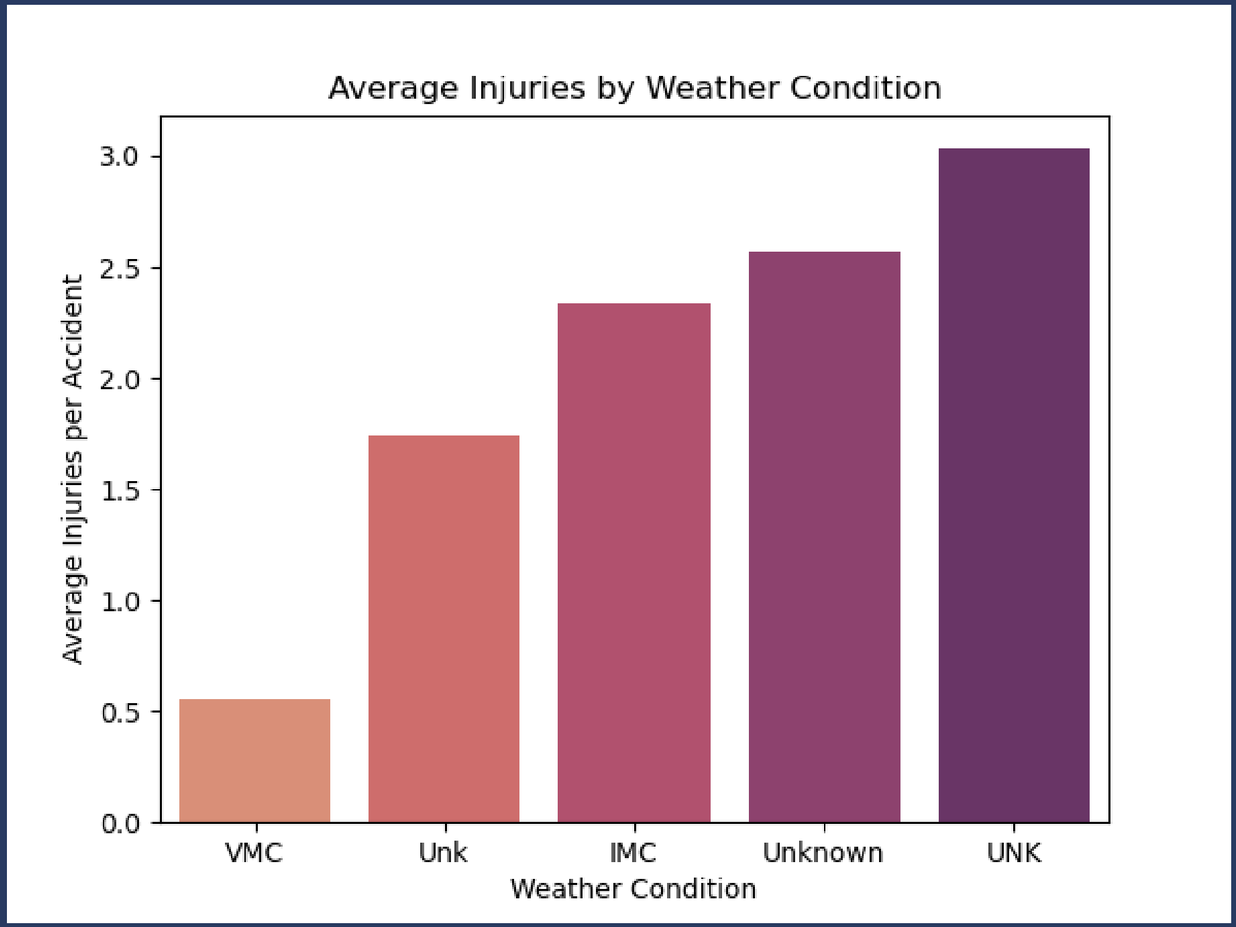
Risk by Flight Phase

- **Most severe:** Taxiing, Standing, Climb/Descent
- **Least severe:** Maneuvering, Go-around, Landing
- **Recommendation:** Prioritize aircraft with robust safety in ground and early-air phases



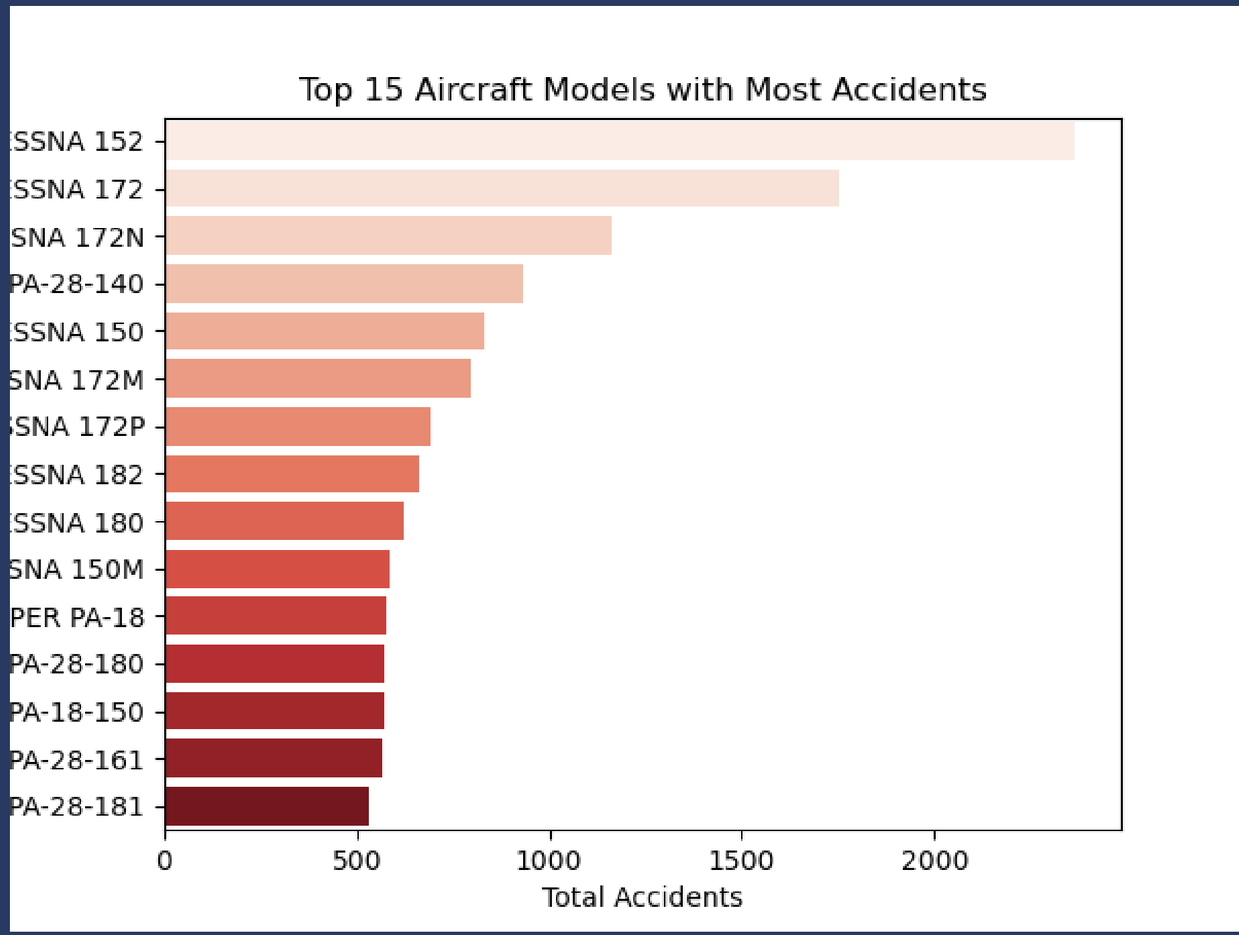
Risk by Weather Condition Impact

- **VMC (clear):** Lowest injuries
- **IMC (instrument):** 2x more severe on average
- **Unknown:** Extremely high severity (often fatal)
- **Recommendation:** Equip aircraft with IMC tools and train for clear-weather prioritization



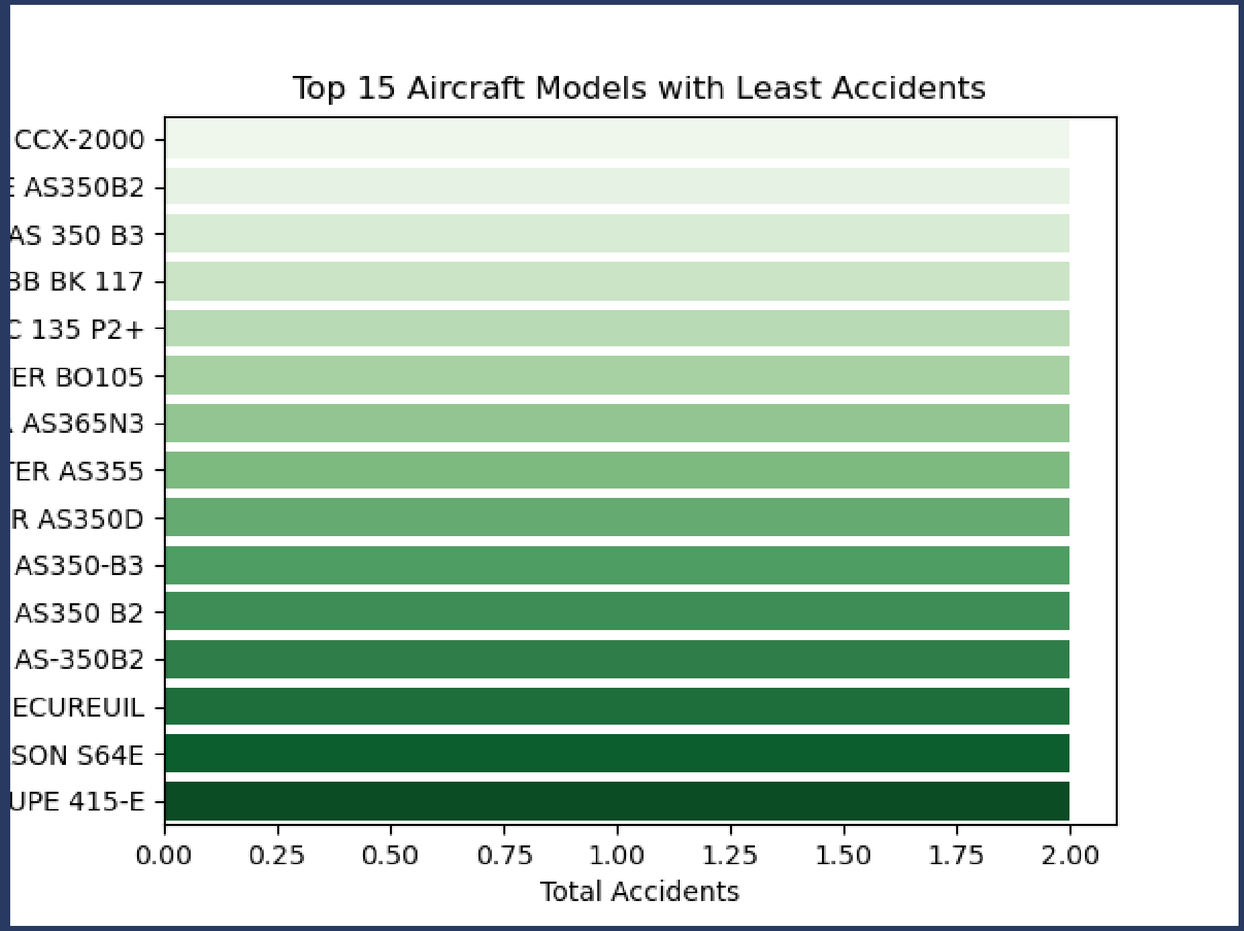
Aircraft Model Risk Most Accidents

- Frequently involved: Cessna 172, Piper PA28
- Likely due to high operational exposure
- **Recommendation:** Use cautiously and with proper context



Aircraft Model Risk Least Accidents

- **Consistently low-accident models:** Lower exposure or stronger safety record
- **Recommendation:** Consider for procurement and pilot training programs



Conclusion

Recommendations

- Favor low-risk flight purposes
- Equip aircraft for safety during ground operations and poor weather
- Focus on low-accident aircraft models with verified safety profiles
- Train staff for IMC and enforce clear-weather operations

Next Steps

- Build an interactive dashboard to support executive decisions
- Refine aircraft selection criteria with expert validation
- Incorporate findings into procurement and training plans

THANK YOU!

Q&A

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