Data-Driven Insights for Safe Aircraft Investment

Helping Your Company Launch Safely into Aviation

Purpose:

To assess aviation risk using historical accident data and recommend the safest aircraft for business expansion.

Key Questions:

Which aircraft models are safest?

Are business flights riskier than personal?

What weather or conditions contribute most to fatal incidents?

Data Understanding

Source: National aviation accident data from (NTSB).

Scope: Over 57,000 accidents from 1962 to 2023

14 key variables (e.g. date, location, weather, model, fatalities)

Preprocessing: Removed unknown values (UNK)

Standardized casing

Cleaned date and category formats

Business Understanding

The Problem:

The company is entering the aviation sector but lacks insight into risks.

Why It Matters:

Aircraft accidents have financial, legal, and human costs. Selecting the safest equipment and routes is crucial for sustainable operations.

Stakeholders:

Head of Aviation Division

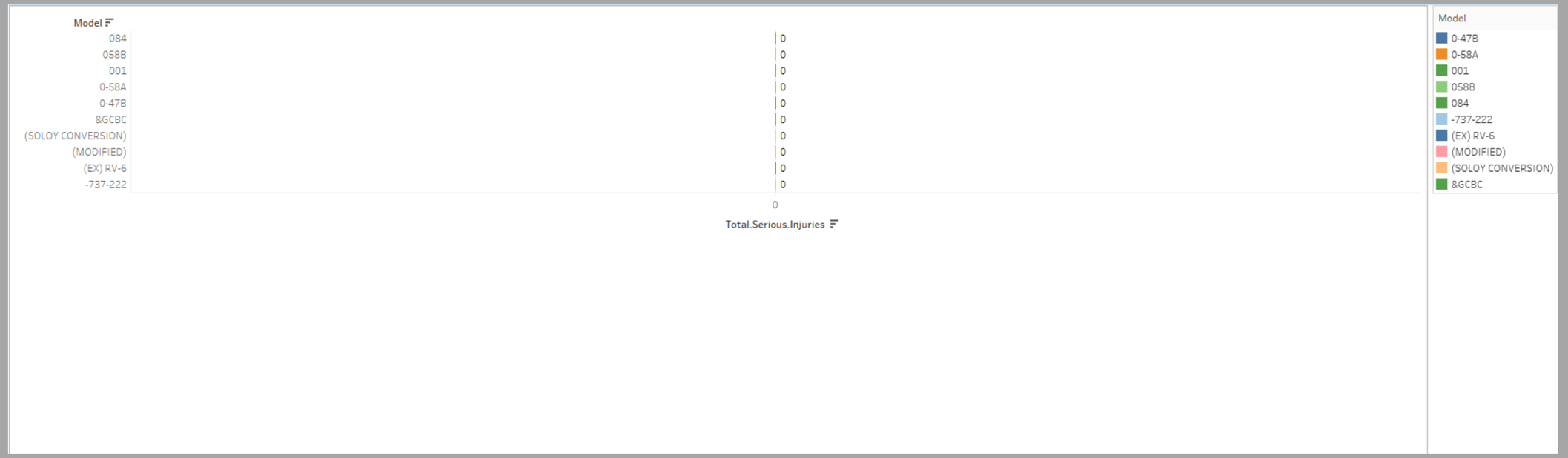
Safety/Operations Managers

Financial Planning Teams

Data Analysis — Safest Aircraft Models

Aircraft like the Cessna 150 and Piper PA-28 show consistently low fatality rates.

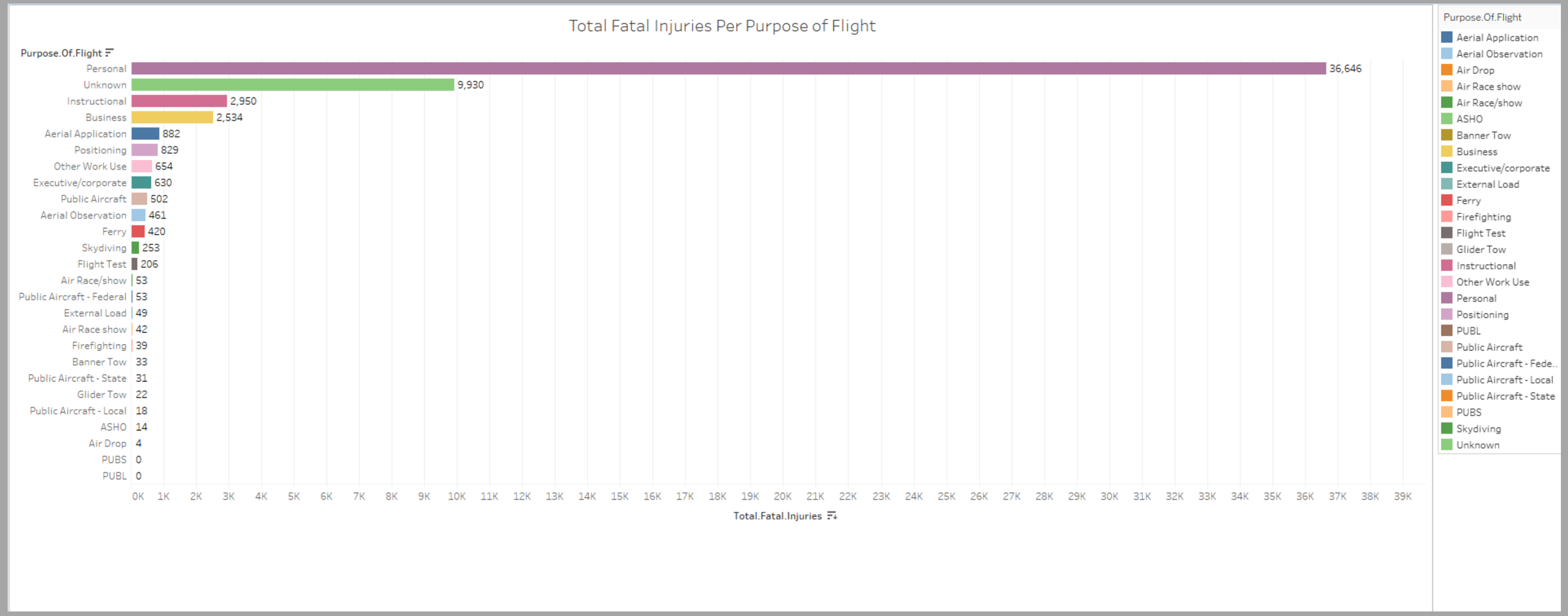
These are ideal starter models for your fleet.



Data Analysis — Flight Purpose Risk

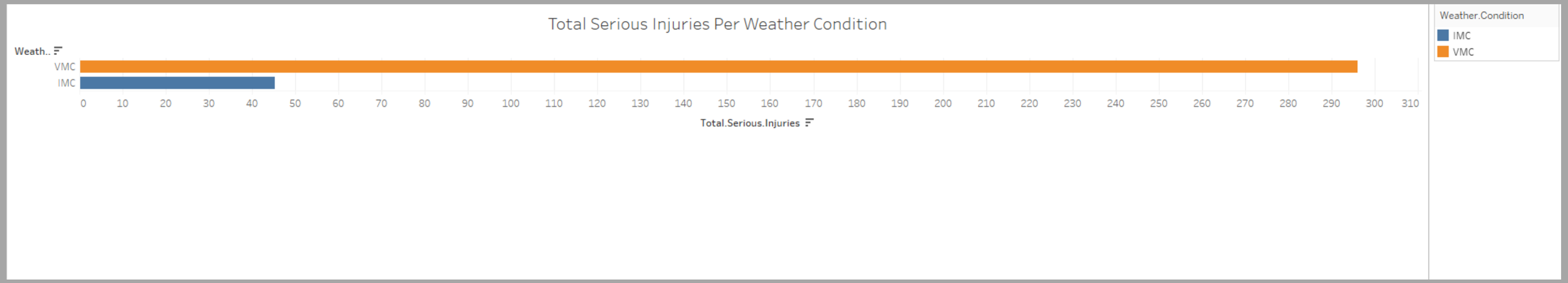
Business flights have a lower average fatality rate than personal flights.

Focus early efforts on commercial operations over personal chartering.



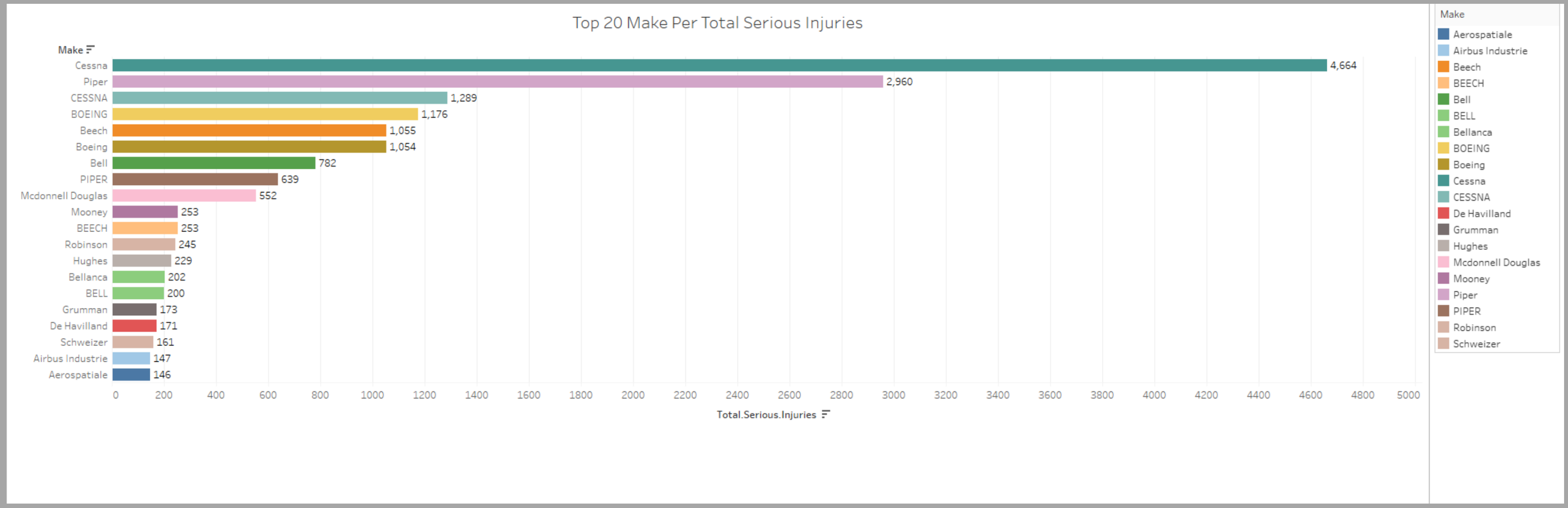
Data Analysis — Weather Risk

Accidents in IMC (Instrument conditions) have significantly more fatalities than VMC.
Start operations in clear weather conditions and train for IMC scenarios gradually.



Data Analysis — Manufacturer Risk

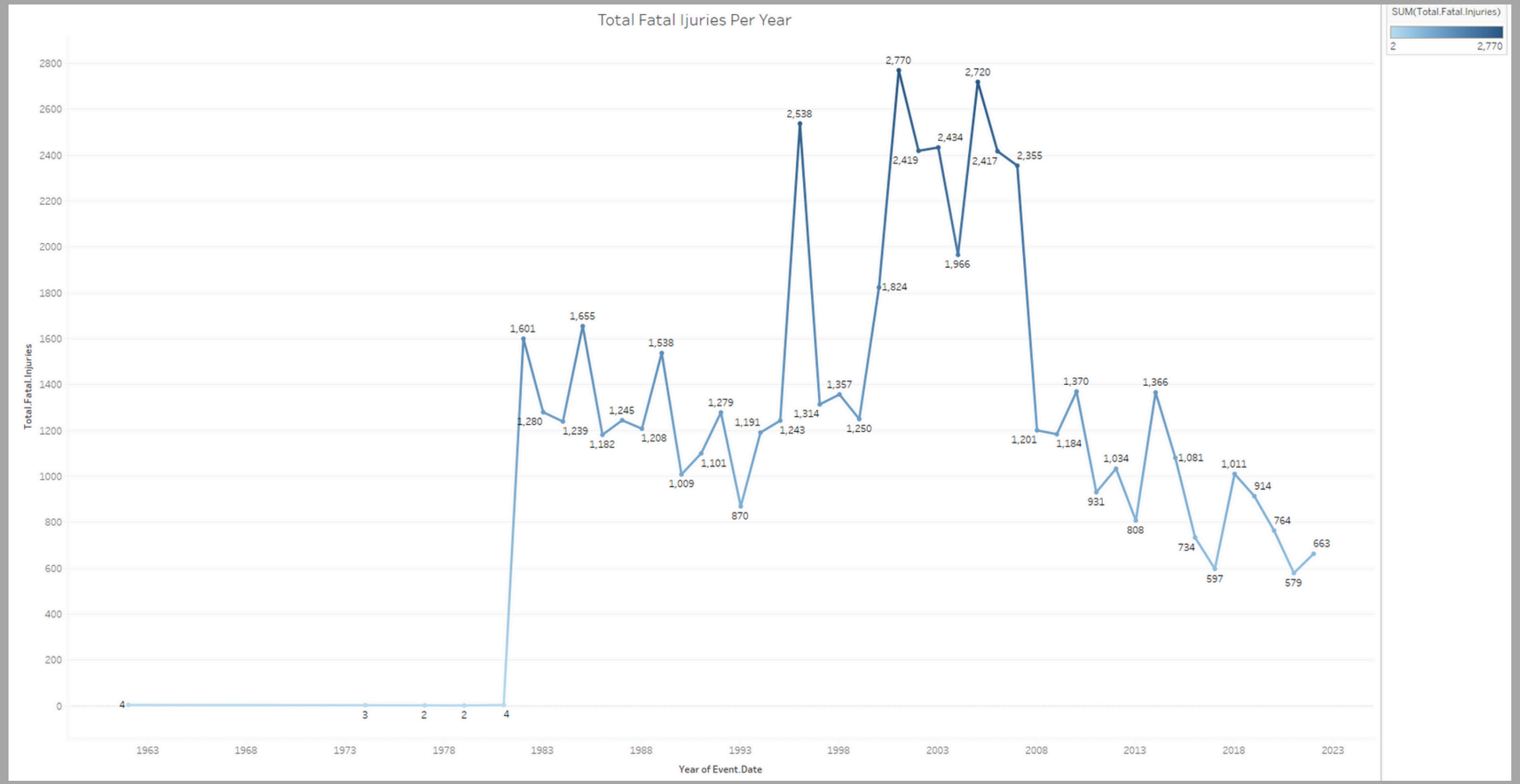
Some popular manufacturers are involved in more severe accidents — further due diligence is required for makes like Cessna and Piper based on use case.



Data Analysis — Time Trend

Although aviation safety has generally improved, recent years show spikes —possibly due to new or underreported risk factors.

Historical data should inform, but recent trends matter more.



Recommendations

Choose low-risk aircraft models like the Cessna 150, Piper PA-28, or similar based on lowest average fatality rate.
Start with business-purpose flights, which have lower average fatality rates than personal ones.
Limit initial operations to clear weather conditions (VMC) and avoid high-fatality areas or models until better prepared.
Prioritize Manufacturers with Proven Safety Records: Based on consistently low fatal accident and severe damage rates, we recommend focusing initial procurement on aircraft from manufacturers such as 177MF LLC , 5 Rivers LLC, and 67 Flying Duchtman. These brands demonstrate a statistically lower inherent risk profile."
Implement a Robust Safety Management System: Regardless of aircraft choice, develop comprehensive operational protocols and training specifically addressing high-risk flight phases (e.g., Takeoff, Landing, Maneuvering).

Next Steps

Operational: Airplane pilots for low-risk conditions and specific models
Build relationships with manufacturers of safest aircraft
Analytical: Develop a live dashboard to track ongoing risks
Continue refining models with newer data
Strategic: Incorporate weather and region-based forecasting
Build contingency protocols for IMC flights
Cost-Benefit Analysis: Integrate acquisition, operational, and maintenance costs with safety data to provide a holistic 'value for safety' assessment.

Thank You

Thank You for Your Time

I welcome any questions or feedback.

Let’s discuss how these insights can support your aviation strategy.

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