AVIATION RISK ANALYSIS FOR STRATEGIC AIRCRAFT ACQUISITION

Executive Summary

•Objective: Identify low-risk aircraft models based on historical accident data.

•Data Source: NTSB aviation accident data (1990–2023).

•Key Deliverables:

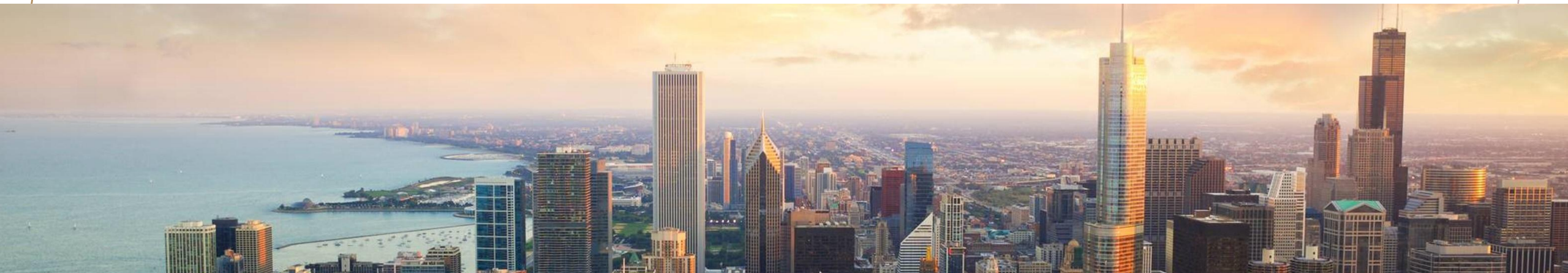
- Trends in aviation accidents.
- Aircraft models with lower fatality and severe damage rates.
- Strategic recommendations for fleet acquisition.

Business Objective

- Support the company's entry into aviation through **data-driven fleet selection**.
- Minimize operational and insurance risks.
- Invest in aircraft models with **historically safer profiles**.

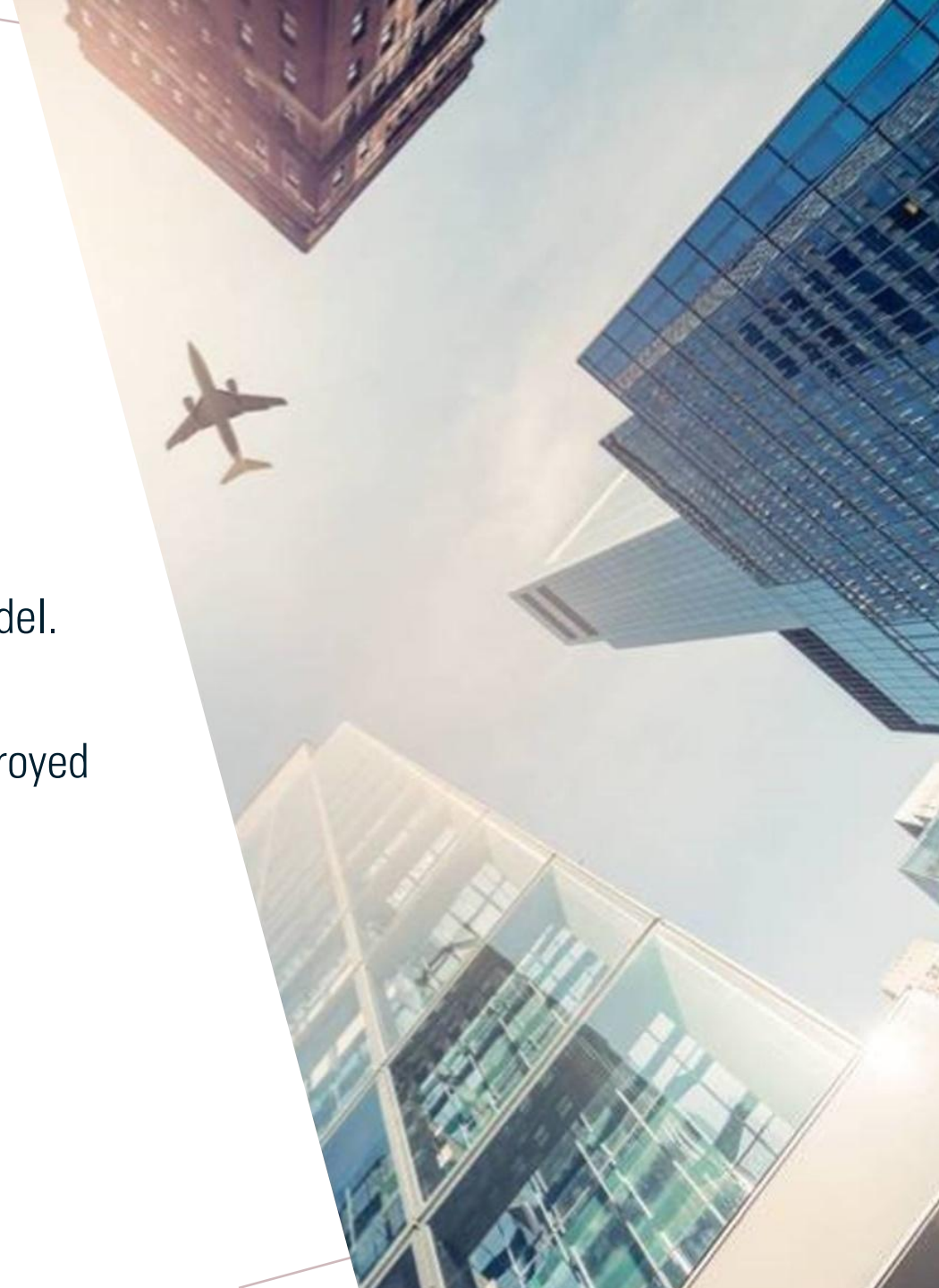
Approach & Data Overview

- **Dataset:** 70,000+ records from NTSB covering 1962–2023.
- **Filtered Scope:**
  - Accidents (not incidents).
  - Events from **1985onward**.
  - Excluded amateur-built aircraft.
- **Methods:**
  - Data cleaning and standardization.
  - Risk metric calculation:
    - Fatal accident rate.
    - Severe damage rate.



KEY METRICS DEFINED

- **FATAL ACCIDENT RATE (%):**
  Percentage of accidents that resulted in fatalities for a given aircraft model.
- **SEVERE DAMAGE RATE (%):**
  Percentage of accidents where the aircraft sustained substantial or destroyed damage.
- **COMBINED RISK PROFILE:**
  Aircraft evaluated on both metrics for balanced safety assessment.



AVIATION ACCIDENT TRENDS (1990–2023)

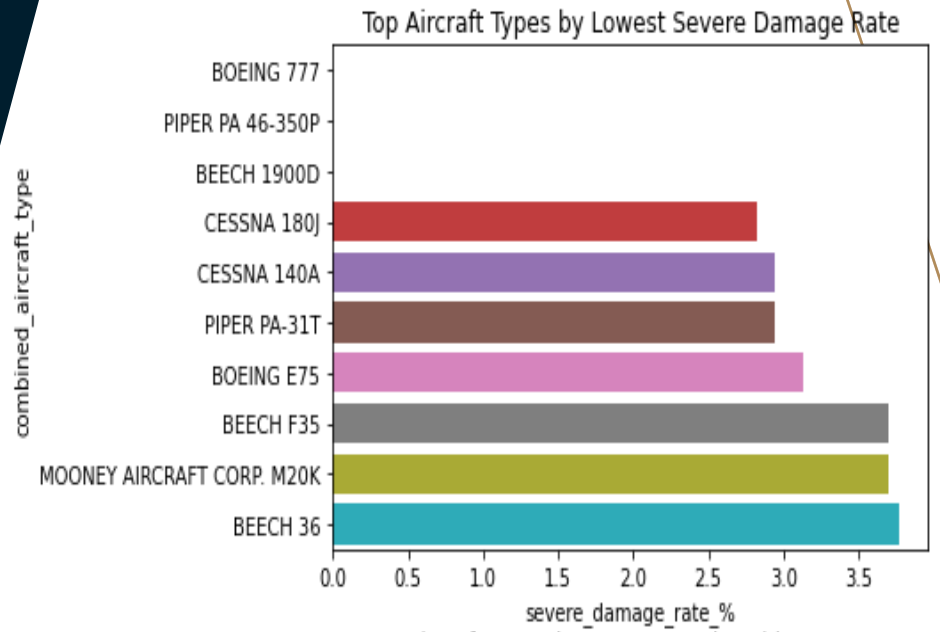
Gradual decline in accidents from 1990 to mid-2010s.
Accident rate stabilizing in recent years.

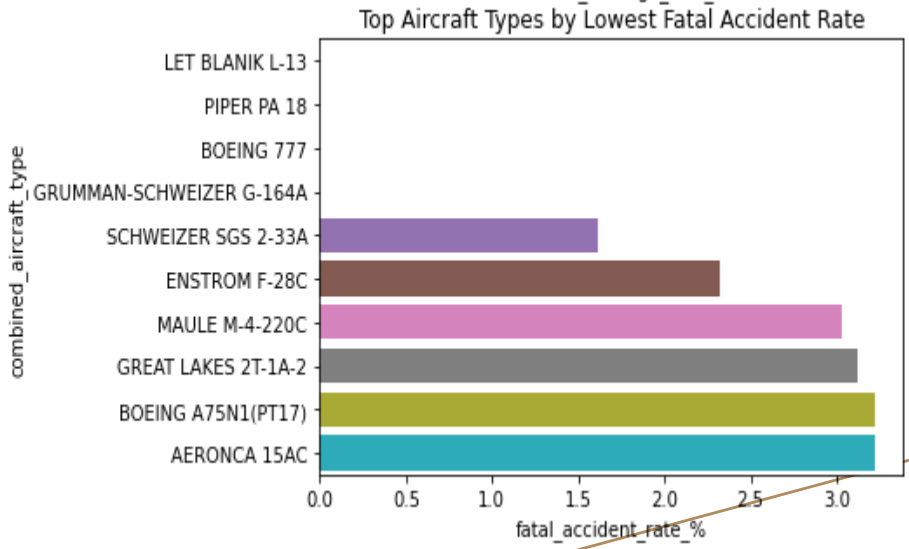
RISK BY AIRCRAFT MODELS

- Certain Models Consistently Demonstrated Lower Fatality And Severe Damage Rates.
- Models With 25+ Recorded Accidents Analyzed For Reliability.

EXAMPLES OF LOW-RISK AIRCRAFT:

- CESSNA 172S
- PIPER PA-28-161
- BEECHCRAFT G36 BONANZA





RISK COMPARISON: FATALITY VS SEVERE DAMAGE

•Strong variation in risk profiles between models.

•Some aircraft are low in both fatal and severe damage rates.

(Insert Scatter Plot: Fatal Accident Rate vs Severe Damage Rate)

Key Insight:

•Not all commonly flown aircraft are equally safe.

Key Findings

•**Accident trends:** Decreasing then stabilizing post-2010.

•**Model risk variation:** Wide differences even within popular makes.

•**Low-risk candidates identified:** Certain Cessna, Piper, and Beechcraft models outperform peers.

•**Limitation:** No normalization for flight exposure (flight hours).

STRATEGIC RECOMMENDATIONS

1. **Prioritize Due Diligence on Low-Risk Models:**
    1. Cessna 172S
    2. Piper PA-28-161
    3. Beechcraft G36 Bonanza
2. **Exercise Caution:**
    1. Conduct deeper review of models with high fatal or damage rates.
3. **Incorporate Flight Hour Data:**
    1. Normalize risk scores if possible before final fleet selection.

THANK YOU

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