



Aviation Safety Risk Analysis for Aircraft Procurement



Data-Driven Insights to Support Safer Aircraft Acquisition

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Business Context & Stakeholder Need

- Company prospects to enter the aviation market
- Aircraft procurement involves significant risk
(Safety and Financial)
- Poor aircraft purchase choices potentially increase costs, downtime and reputational risk

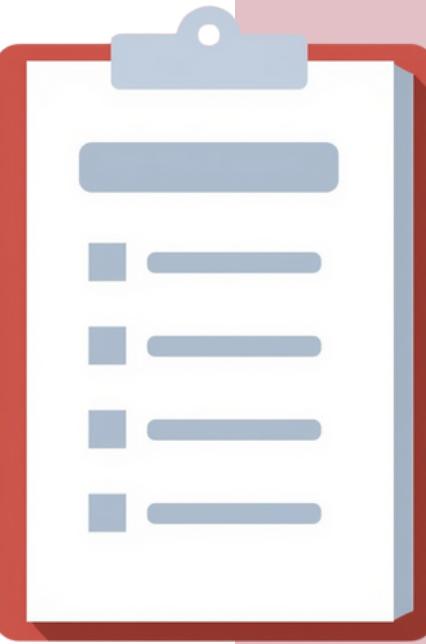


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Project Objective

- Use recent historical accident data to assess aircraft risk
- Identify aircraft types associated with lower risk
- Support safer, data-informed procurement decisions



Data Overview

Data Used: Aviation Crashed Flights Data

- Historical aviation accident records (2018 - 2022)
- Aircraft types, location and operator
- Accident outcomes (Aircraft Damage, Fatalities)

Aircraft damage range:

- *None*
- *Minor*
- *Substantial*
- *Write-Off*
- *Unknown*



Key Business Questions

- How has accident risk changed over time?
- Which aircraft or aircraft types are more prone to accidents?
- Which aircraft provide the most safety and are the most durable in accidents?



Method

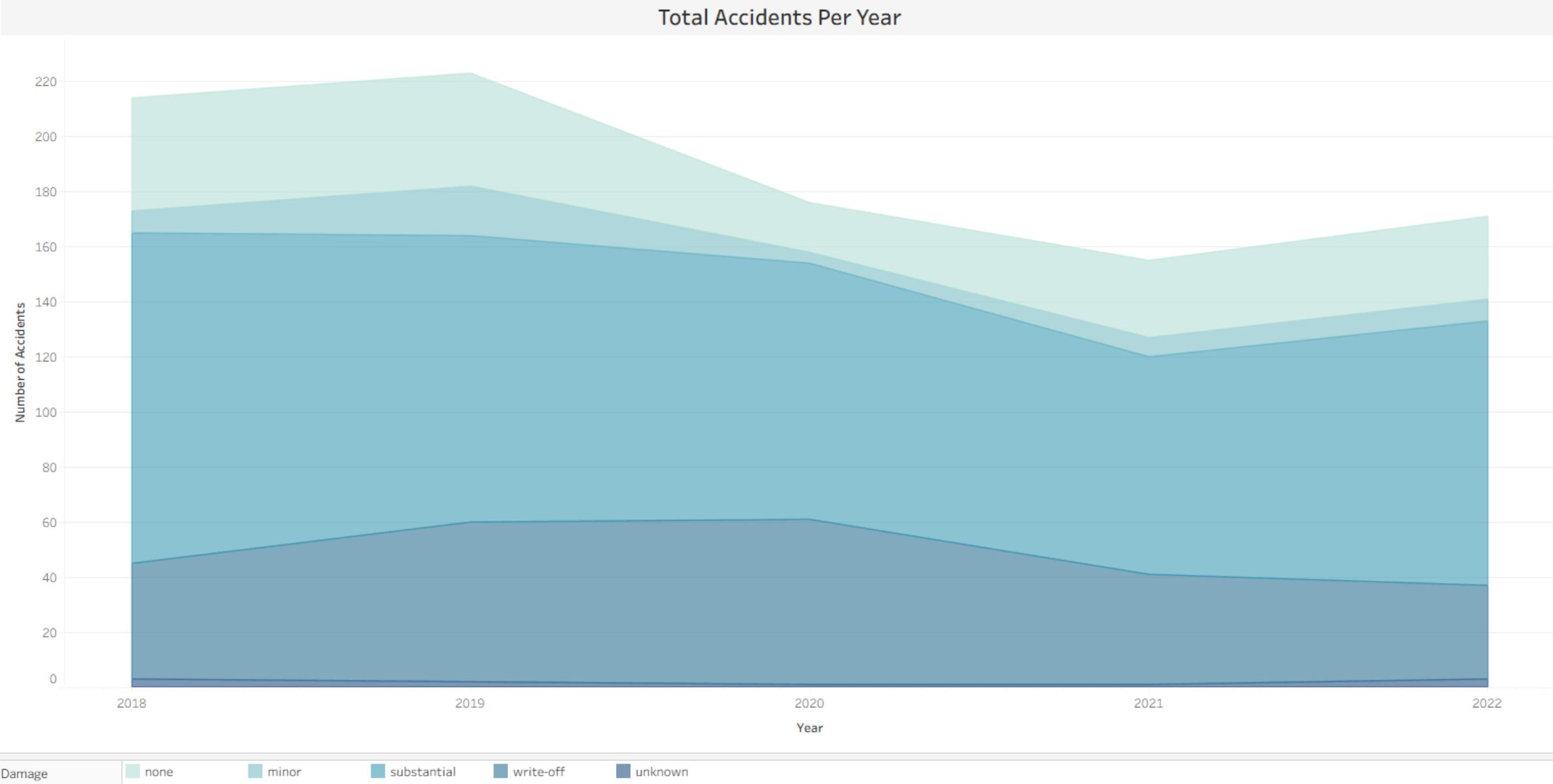
How was the data Analysed?

- Cleaned and standardized accident records
- Grouped accidents by aircraft manufacturer, model and year
- Identified the most and least safe model by manufacturer in terms of aircraft durability and passenger safety



Key Finding #1

Accident Trend Over Time



Overall patterns suggest changes in safety over time.

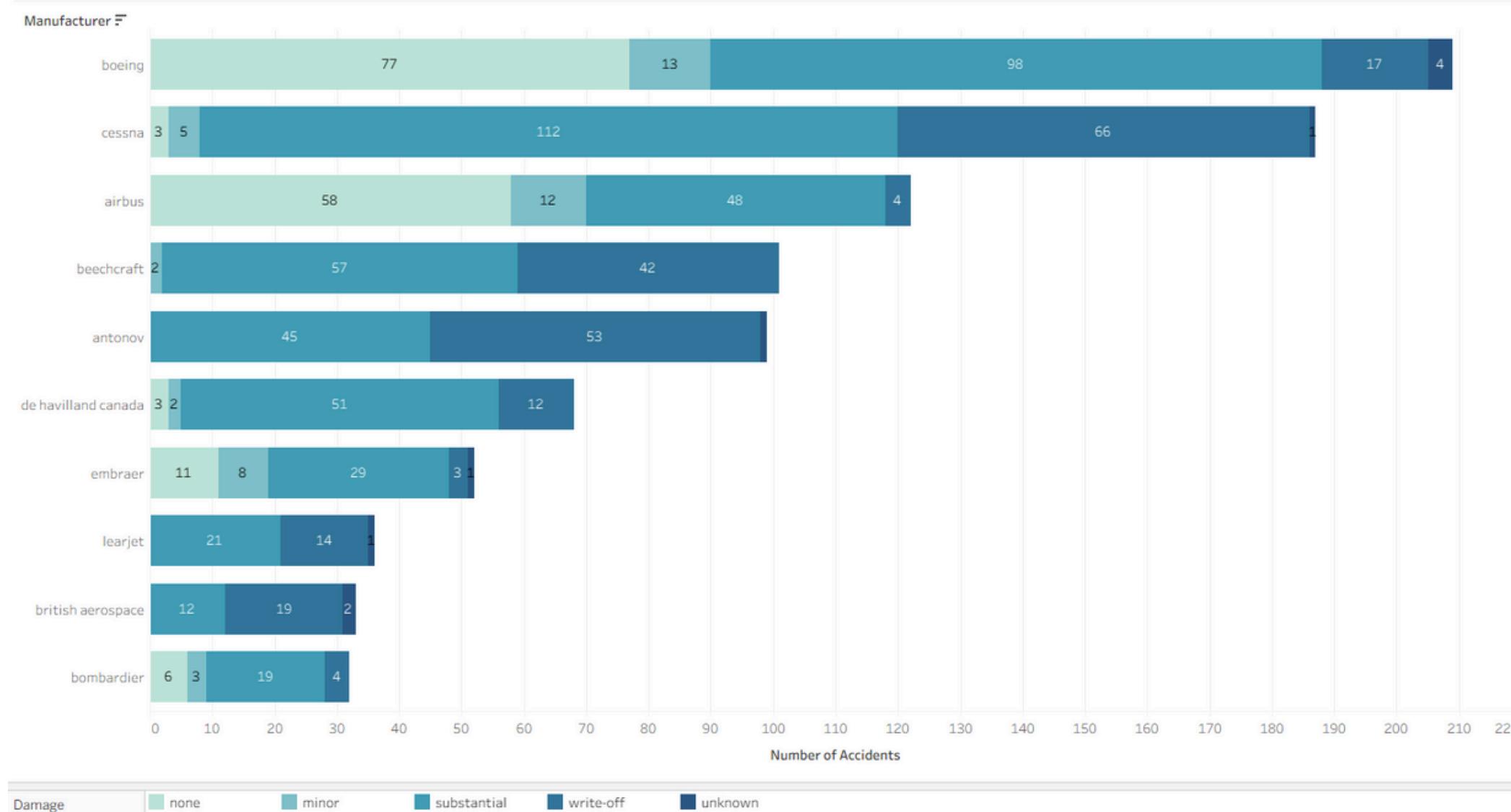
Probable cause:

- Stricter safety standards/ policy reinforcement
- Newer aircraft models with better technology

Inference:

- Decreasing risk supports business venture into aviation sector

Top Manufacturers by Accident Occurrence



Key Finding #2

Accident Risk Varies by Aircraft Type

Some aircraft categories appear consistently in higher accident counts.

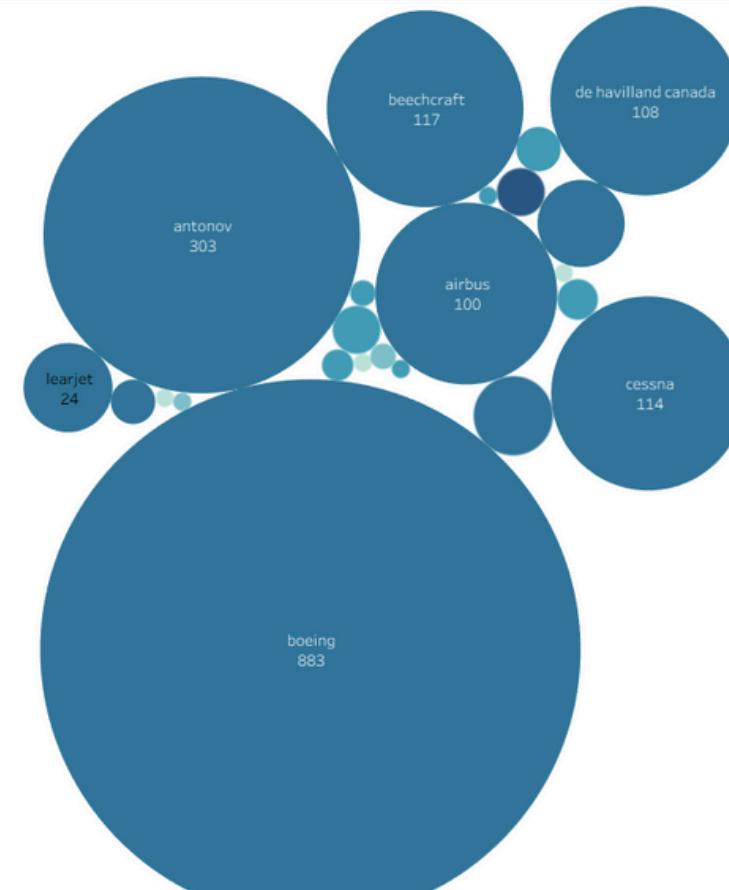
Probable cause:

- Larger Fleet size & Market share
- Not representative of inherent risk

Inference:

- Further analysis into particular aircraft model, not just manufacturer, to establish safer/more durable aircraft.

Top Manufacturers with by Passanger Fatalities



Key Finding #3

Some Aircraft Are Consistently Safer

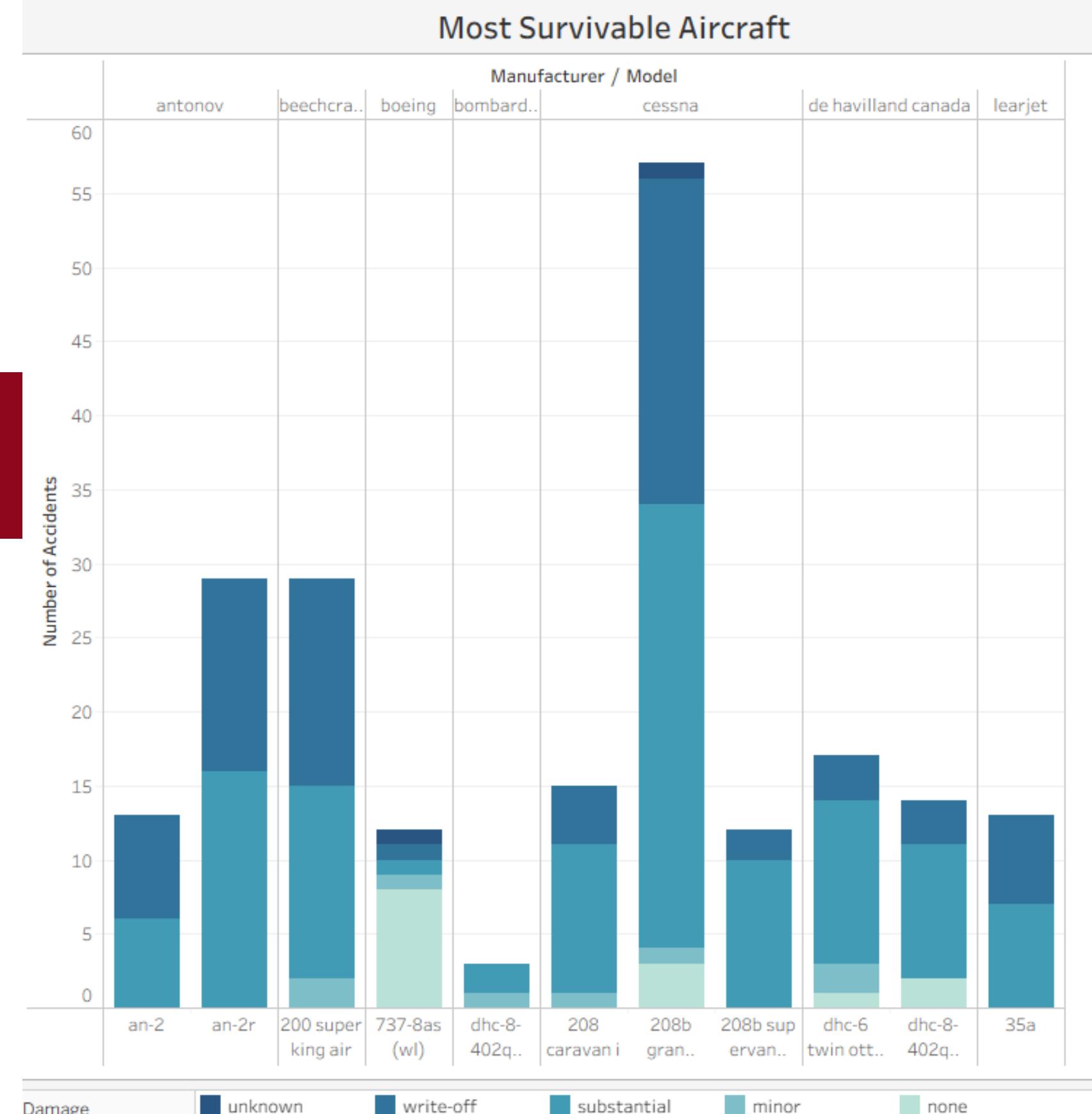
Some aircraft appear in a number of accidents but sustain little to no damage or fatalities, others rarely appear.

Probable cause:

- Potential safety and durability in some aircraft
- Low accident likelihood on some aircraft

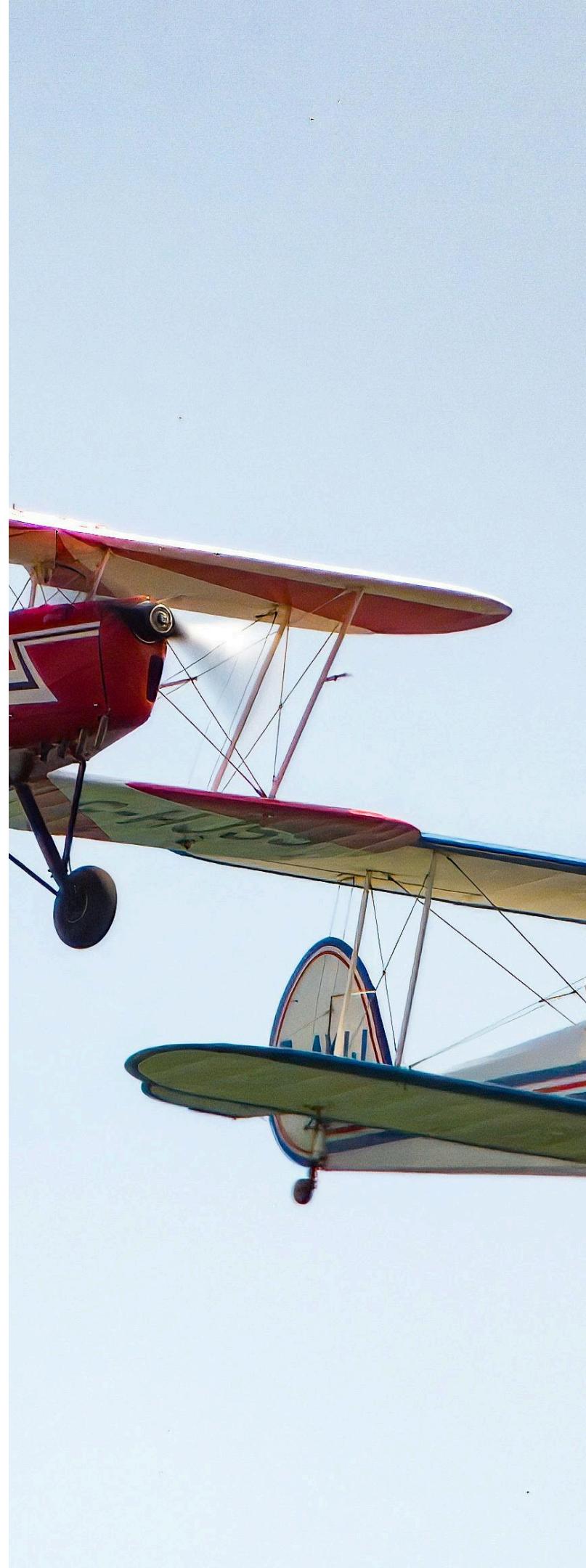
Inference:

- These type of aircraft present lower risk, showing more value as entry to market purchases



Business Recommendations

- Prioritize aircraft types with lower accident frequency
- Prioritize aircraft types with higher airplane and passenger survivability
- Favor manufacturers with large fleets, but focus on safer models



Business Impact



- Reduced safety and operational risk
- Lower long-term costs from accidents and downtime
- Stronger data-driven procurement decisions



Conclusion

- Historical accident data provides actionable safety insights
- Aircraft risk varies meaningfully by type and time
- Data-driven procurement can reduce risk and improve outcomes

Reference Links



GitHub repository:

<https://github.com/reevesgonah/phase-1-capstone-project>

Tableau Dashboard:

https://public.tableau.com/views/phase-1-project-dashboard/Dashboard1?:language=en-US&publish=yes&:sid=&:redirect=auth&:display_count=n&:origin=viz_share_link

Original Dataset:

<https://www.kaggle.com/datasets/khsamaha/aviation-accident-database-synopses>