AVIATION SAFETY RISK ANALYSIS

IDENTIFYING LOWER-RISK AIRCRAFTS TO SUPPORT ACQUISITION DECISIONS

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1.Business Problem and Objective

- The company is expanding into the aviation industry and must make informed aircraft acquisition decisions.
- Aviation accidents present significant safety, financial, and reputational risks.
- Leadership currently lacks historical insight into which aircraft manufacturers and models are associated with lower operational risk.
- This analysis uses historical aviation accident data to support safer, data-driven aircraft purchasing decisions.

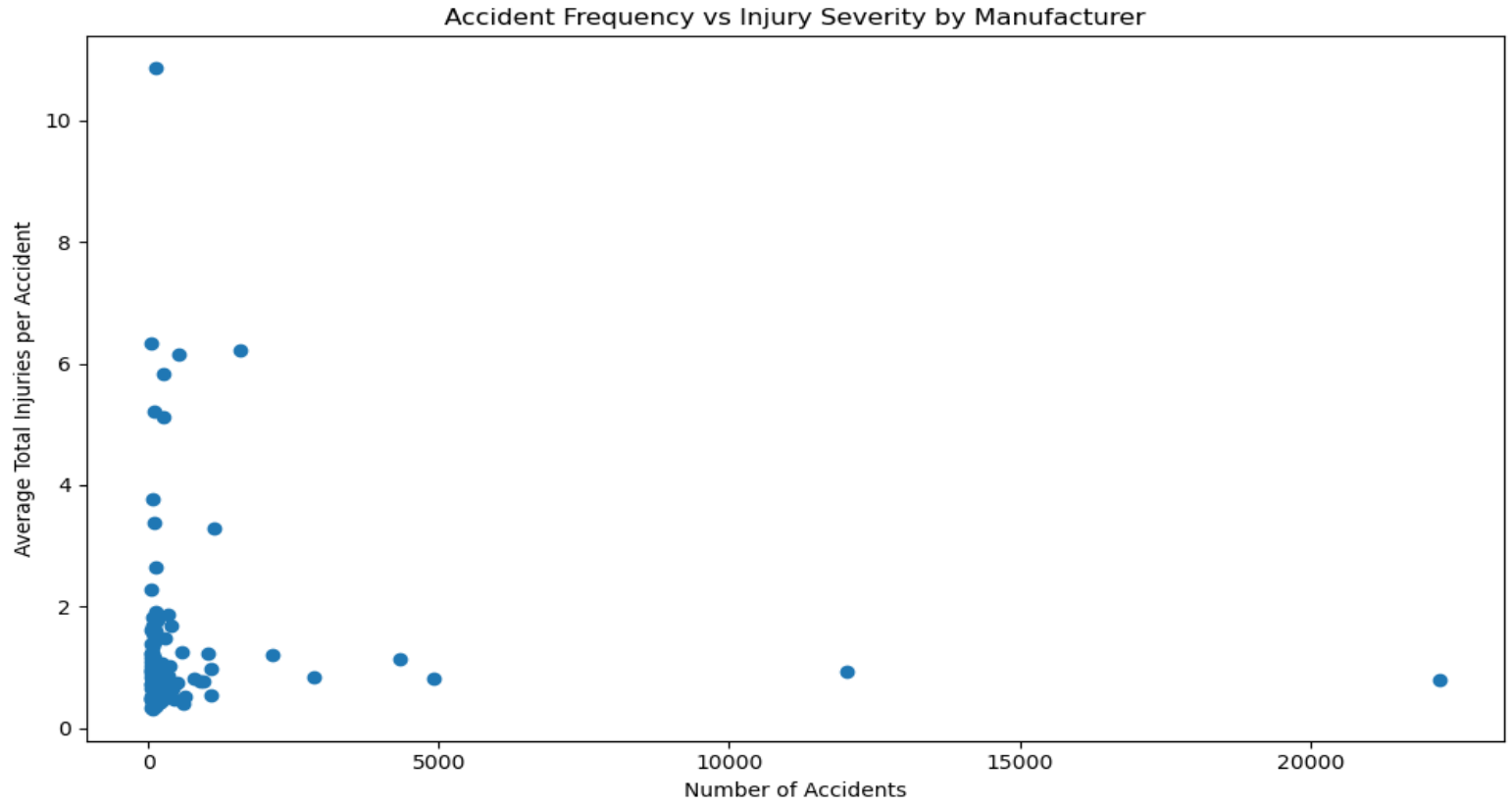
2.Data and Analytical Approach

- Historical aviation accident and incident data sourced from the National Transportation Safety Board (1962–2023).
- Each record represents a reported aviation event, including aircraft information and injury outcomes.
- Data was cleaned and filtered to focus on aircraft manufacturers and injury severity.
- Risk was assessed using injury severity metrics rather than accident frequency alone.
- Findings were supported using aggregated analysis and visual exploration.

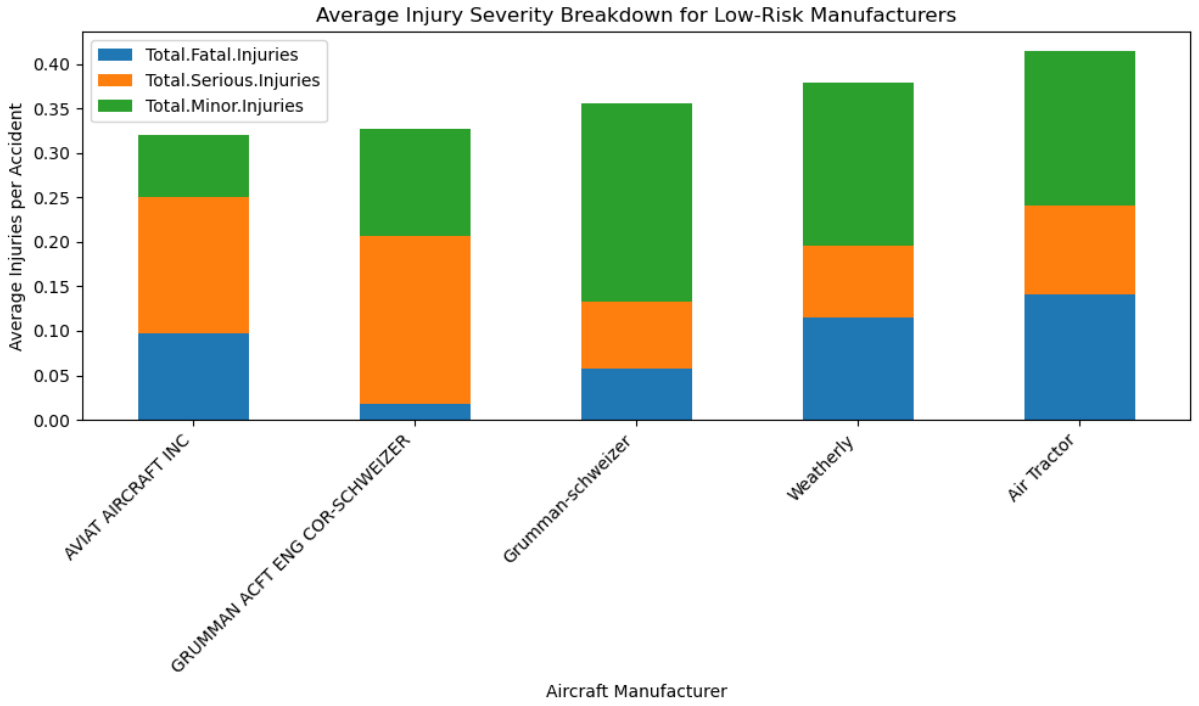
3. Key Safety Insights from Historical Data

- Aviation safety risks vary significantly across aircraft manufacturers.
- Injury severity provides a more meaningful measure of risk than accident frequency alone.
- Some manufacturers are consistently associated with lower average injury counts per accident.
- High accident counts do not always correspond to higher injury severity.
- Below are examples of visualizations.

Accident frequency vs. injury severity



Average Injury Severity Breakdown for Low-Risk Manufacturers.



4. Reccomendations

Recommendation 1: Prioritize Lower-Risk Aircraft Manufacturers

- Historical accident data shows that some aircraft manufacturers are consistently associated with lower average injury severity.
- Aircraft acquisitions should prioritize manufacturers with lower injury outcomes per accident.
- This approach reduces exposure to safety, legal, and reputational risk.

Business Impact

Lower injury severity reduces operational risk, insurance costs, and potential reputational damage.

Recommendation 2: Avoid Decisions Based Solely on Accident Frequency

- Some aircraft manufacturers appear frequently in accident records due to higher usage, not poorer safety performance.
- Accident counts alone can be misleading when evaluating aircraft risk.
- Aircraft selection decisions should focus on injury severity metrics rather than raw accident frequency.

Business Impact:

Prevents the exclusion of widely used but relatively safe aircraft and supports more accurate risk assessment.

Recommendation 3: Use Injury Severity as a Core Safety Metric

- Accident frequency alone does not provide a complete picture of aircraft safety risk.
- Injury severity offers a more meaningful and actionable measure of operational risk.
- Future aircraft evaluations should incorporate injury severity metrics alongside cost, performance, and operational needs.

Business Impact:

Enables consistent, data-driven safety assessments and supports safer long-term aircraft procurement decisions.

5. Interactive Dashboard for Further Exploration

- An interactive Tableau dashboard was created to allow stakeholders to explore aviation safety risk in greater detail.
- Users can examine injury severity, accident trends, and manufacturer-level risk interactively.
- The dashboard enables flexible exploration to support ongoing decision-making.
- **View the dashboard on Tableau Public:**
- https://public.tableau.com/app/profile/eve.michelle/viz/AviationSafetyRiskAnalysis/Dashboard1?publish=yes

6.Conclusion

- Aviation safety risks varies meaningfully across aircraft manufacturers.
- Injury severity is a more reliable indicator of operational risk than accident frequency alone.
- Data-driven evaluation can reduce safety, financial, and reputational exposure as the company enters the aviation market.

7.THANK YOU

- Questions & Discussion