

Aviation Risk Analysis for Aircraft Acquisition

Identifying Low-Risk Aircraft Types Using
Historical Accident Data

Overview

- ▶ Goal: identify aircraft types with the lowest risk profiles.
- ▶ Company expanding into the aviation industry (commercial & private operations).
- ▶ Stakeholder: Head of Aviation Division.
- ▶ Purpose: provide safety insights to reduce risk & guide investment.

Business Understanding

Business Problem & Objectives:

- ▶ Company expanding into the aviation industry.
- ▶ Need to identify low-risk aircraft types and manufacturers.
- ▶ Analyze accident trends.
- ▶ Goal: Support data-driven purchasing decisions.
- ▶ Success criteria: actionable recommendations for safer aircraft acquisition, clear visuals, interactive dashboard.

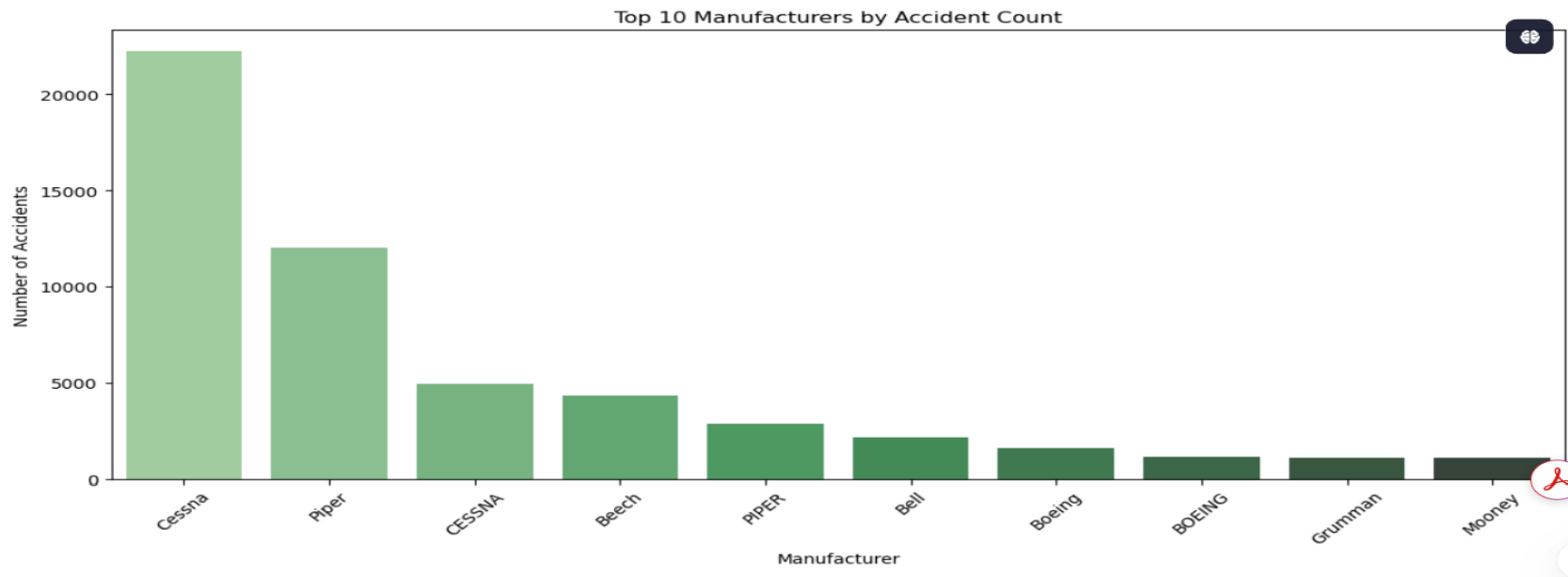
Data understanding

Data Overview:

- ▶ Source: National Transportation Safety Board (NTSB).
- ▶ Coverage: 1962-2023, US and international waters.
- ▶ Columns: Aircraft type, manufacturer, year, fatalities, location, accident date, severity, etc.

Accident Counts by Manufacturer

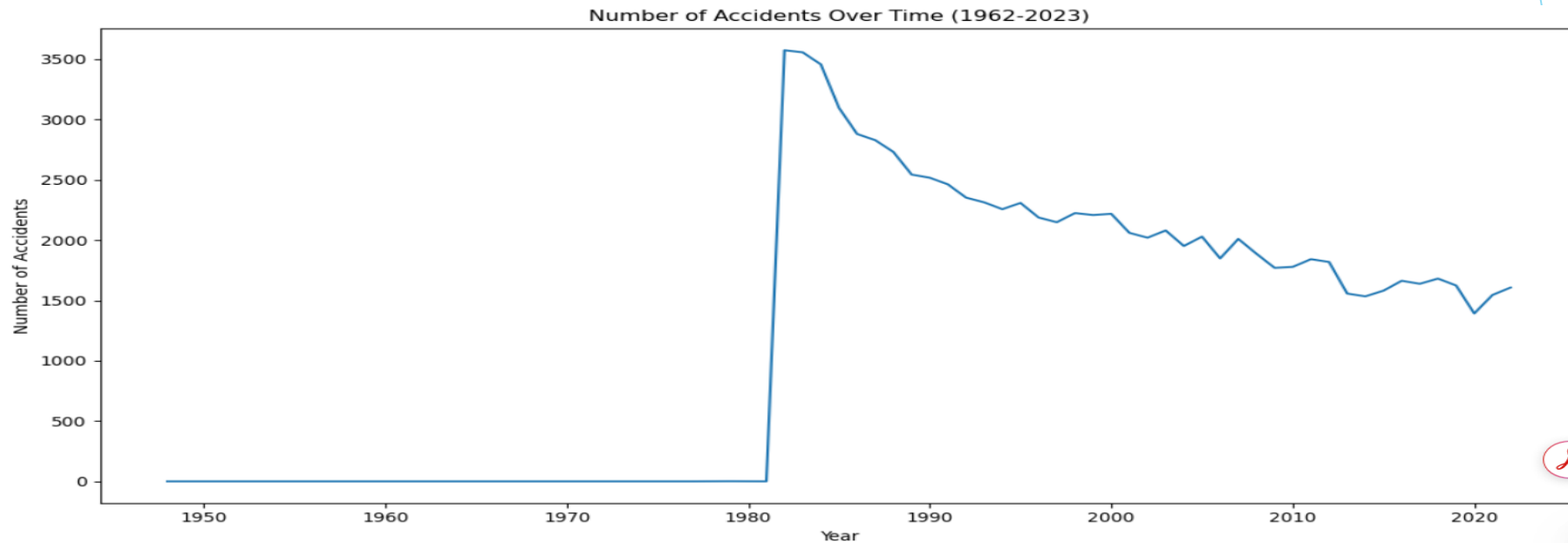
- ▶ Accident Counts by Manufacturer chart:



- ▶ Cessna & Piper have the highest accident counts.
- ▶ Mooney, Beechcraft have fewer accidents
- ▶ High counts are partly due to fleet size & popularity
- ▶ Takeaway : Accident concentration is highest in popular manufacturers (Cessna, Piper).

Accident Trends Over Time

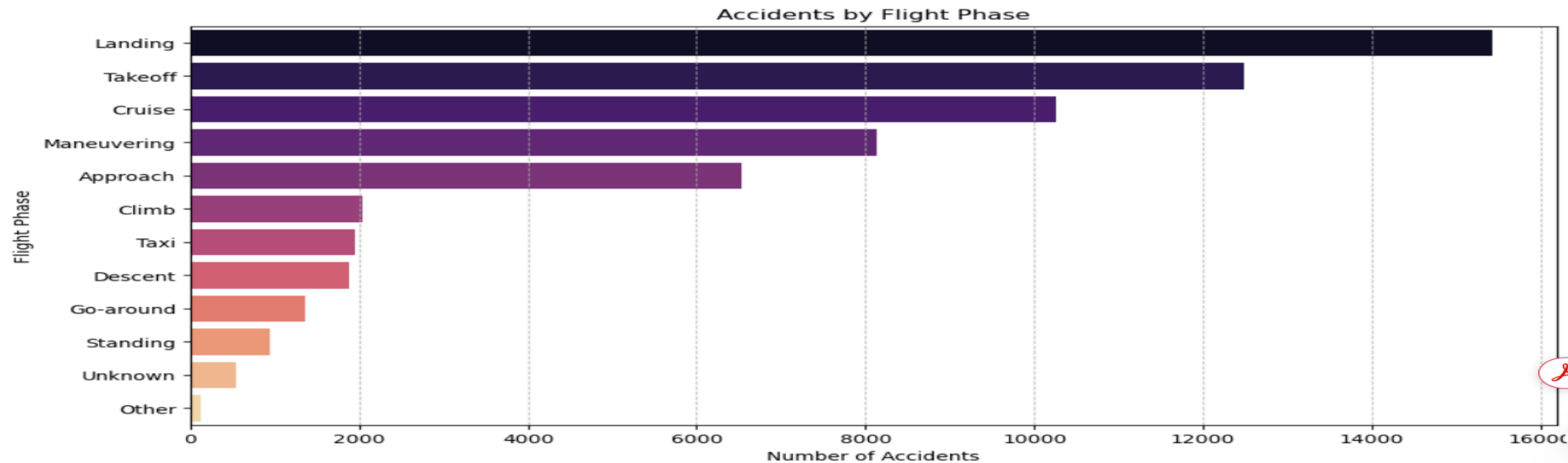
- ▶ Accident Trends Over Time (1962-2023) chart:



- ▶ Peak in accidents around the 1980s.
- ▶ Steady decline since mid-1980s.
- ▶ Small fluctuations after 2000s.
- ▶ Takeaway: Overall, accidents have decreased, showing strong safety improvements.

Accident by Flight Phase

- ▶ Accident by Flight Phase chart:



- ▶ Landing is the most accident-prone phase.
- ▶ Takeoff also shows a high risk.
- ▶ Cruise, maneuvering, and approach contribute significantly.
- ▶ Takeaway : Critical phases (Landing & Takeoff) account for most accidents.

Key Findings

- ▶ Cessna & Piper have the **highest accident counts** (due to wide usage).
- ▶ Accident rates have **declined since the 1980s**, showing safety improvements.
- ▶ Most accidents occur during the **Landing and Takeoff** phases.
- ▶ Smaller manufacturers like **Mooney** show fewer reported accidents.
- ▶ **Takeaway:** Safety has improved overall, but **critical phases & high-use aircraft** remain risk areas.

Recommendations

Key Recommendations:

- ▶ Prioritize acquisition of **aircraft with lower accident records** (e.g., Mooney, Beechcraft).
- ▶ Invest in **training & safety protocols** for Landing/Takeoff.
- ▶ Consider **modern aircraft models** benefiting from post-1980s safety improvements.
- ▶ Use findings to **guide procurement & operational risk management**.
- ▶ **Takeaway: A balanced strategy:** safe aircraft choices and strong pilot training to minimize risks.

Conclusion

- ▶ Accident data reveals **clear safety trends** over decades.
- ▶ Manufacturers & flight phases play a major role in accident risk.
- ▶ Data-driven insights enable **smarter, safer fleet acquisition**.

✈ *“Safer skies through data-driven decisions.”*

Thank You