

US Aviation Accidents Analysis (1982–2022)

Trends, Manufacturers, Injuries, and Risk Factors Analysis

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Business Problem

- The company plans to enter the aviation sector but lacks expertise in aircraft safety.
To reduce risk, we aim to identify the safest aircraft models using historical accident data.
This analysis will guide data-driven decisions for fleet investment.

Objective of the Study

- To analyze aviation accident data to identify aircraft manufacturers and models with the lowest safety risks.

The goal is to support informed decisions for safe and strategic investment in aircraft operations.

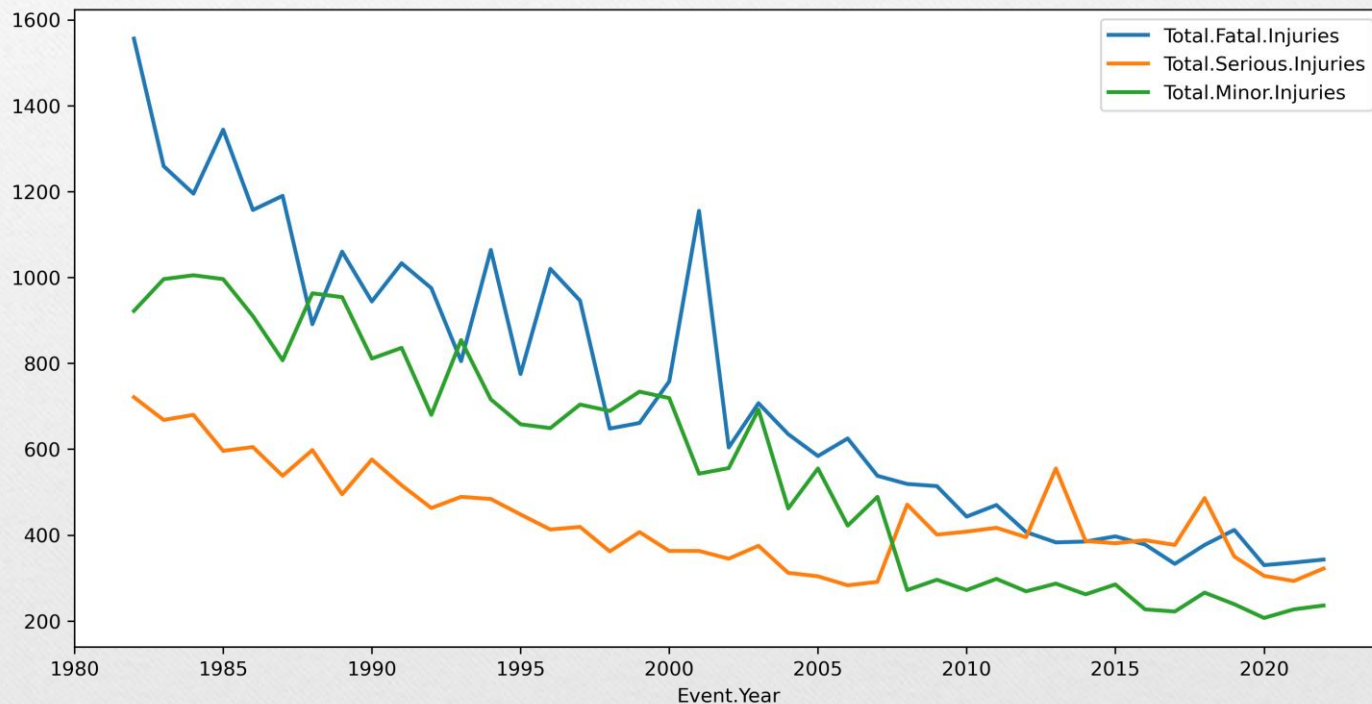
Decline in Aviation Injuries

Jagged curve but downward trend

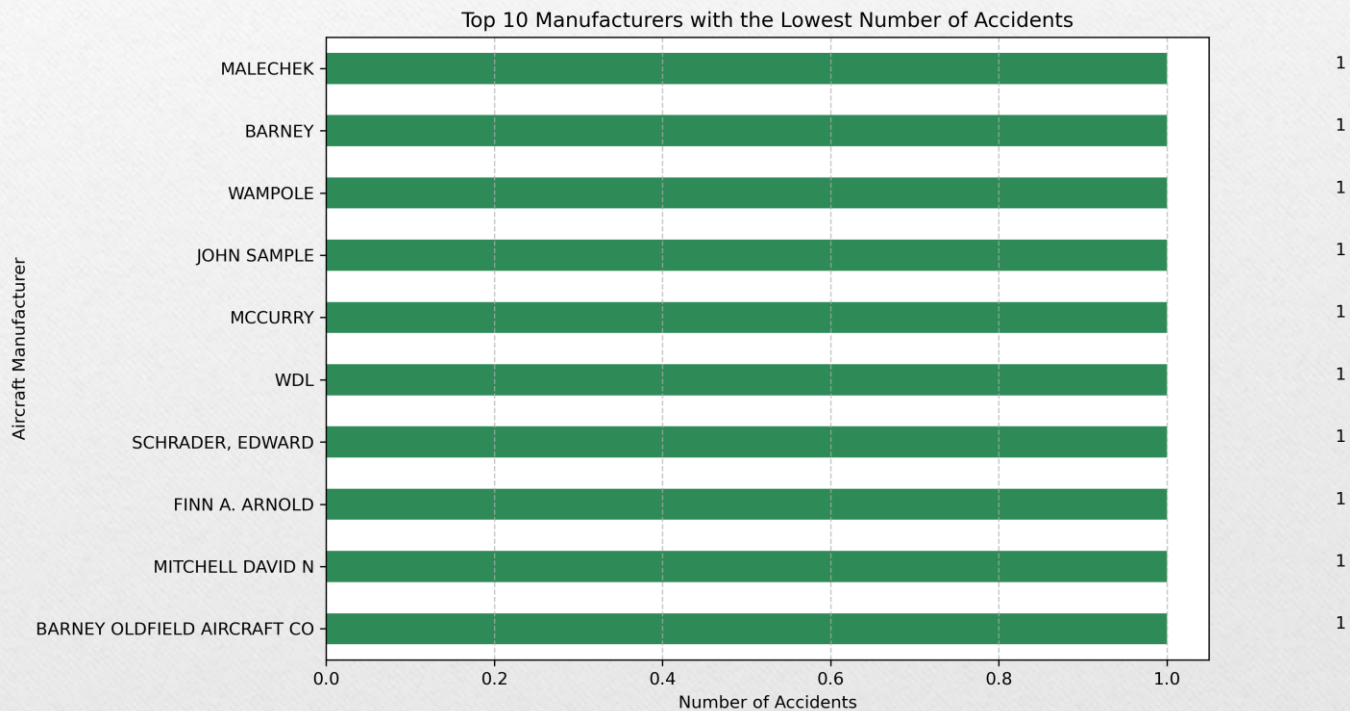
Fewer injuries = safer skies

Major drop in 2020 (COVID), slight rebound afterward

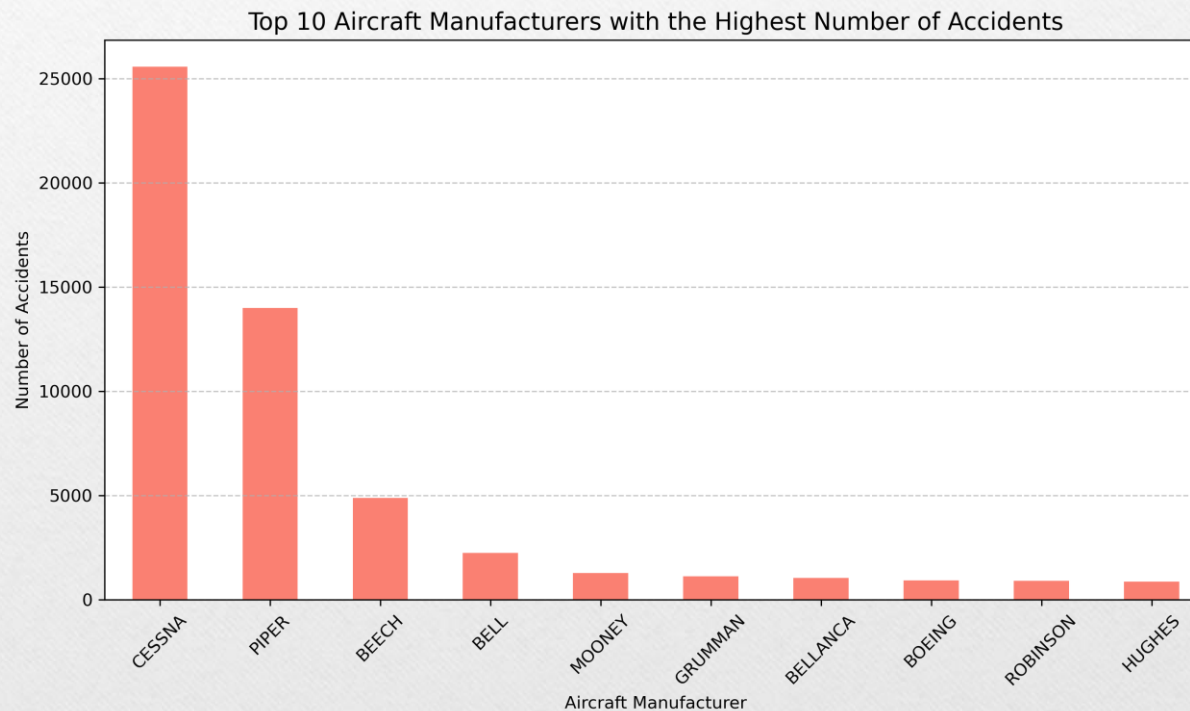
→ Long-term progress in aviation safety



Low accident counts \neq high safety
May reflect low production, small fleets, or limited usage
Few or no serious or fatal injuries
⚠ Caution: Limited conclusions without standardized rates



Cessna, Piper, Beech, etc. have high accident counts
Linked to production volume and intensive usage
More flights = more exposure
→ High accident volume \neq poor quality





Frequency \neq Severity

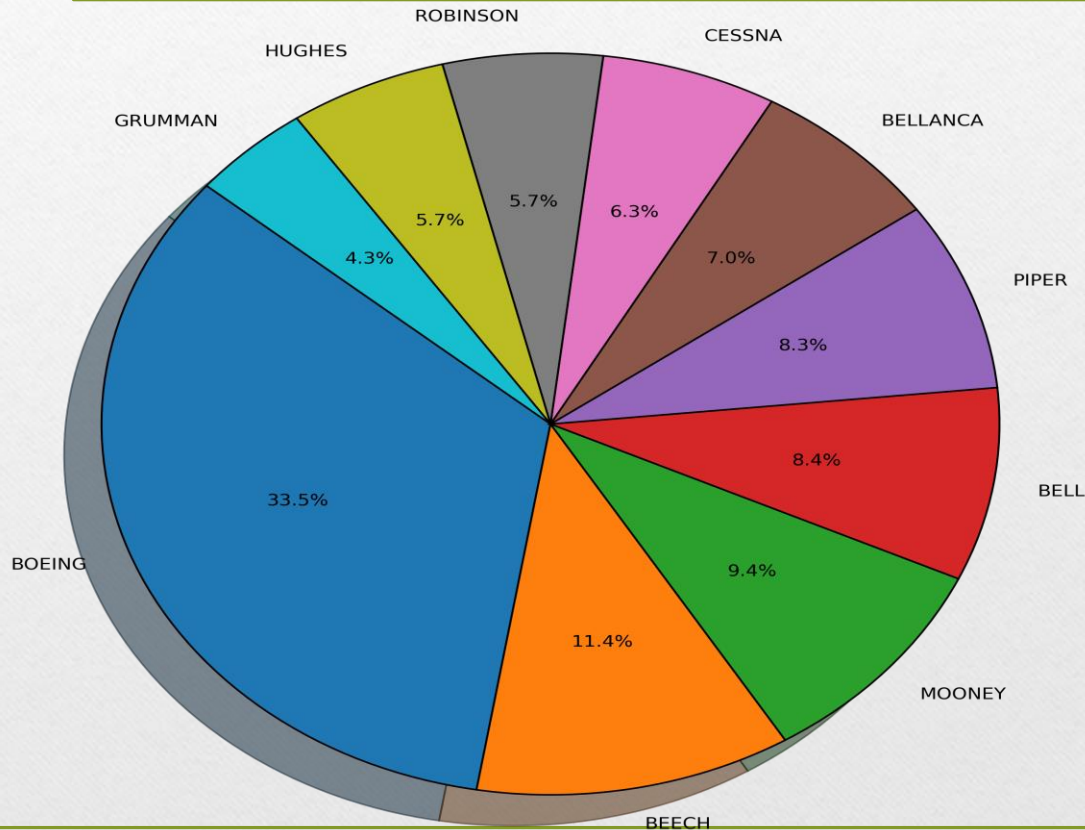
Cessna: frequent but less severe (6.3%)

Boeing: high proportion of severity rate (33.5%) — large aircraft, more passengers

Smaller makers: fewer accidents, but often more severe

→ Rare accidents can be more dangerous

Proportion of Severity Rate by Manufacturer



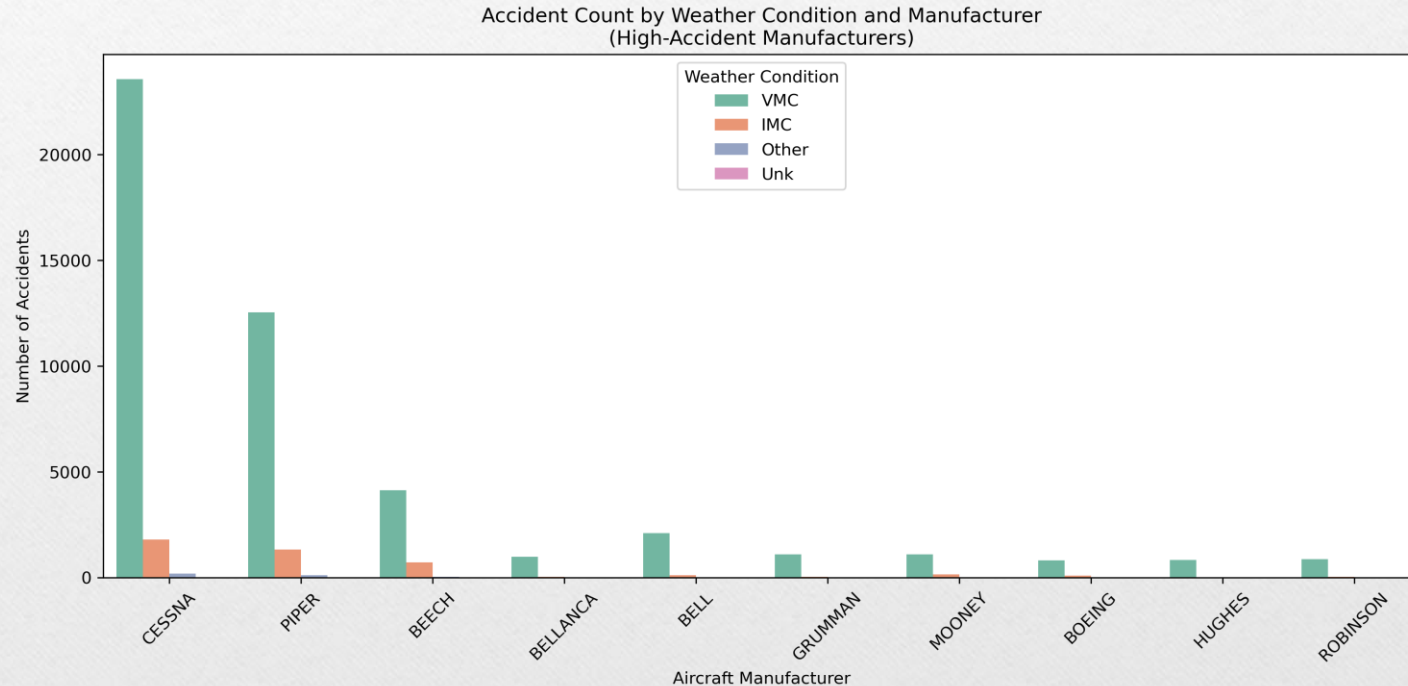


VMC vs IMC

Most accidents happen in Visual Meteorological Conditions (VMC)

IMC more common among complex-use manufacturers

→ Weather is not the main cause of accidents





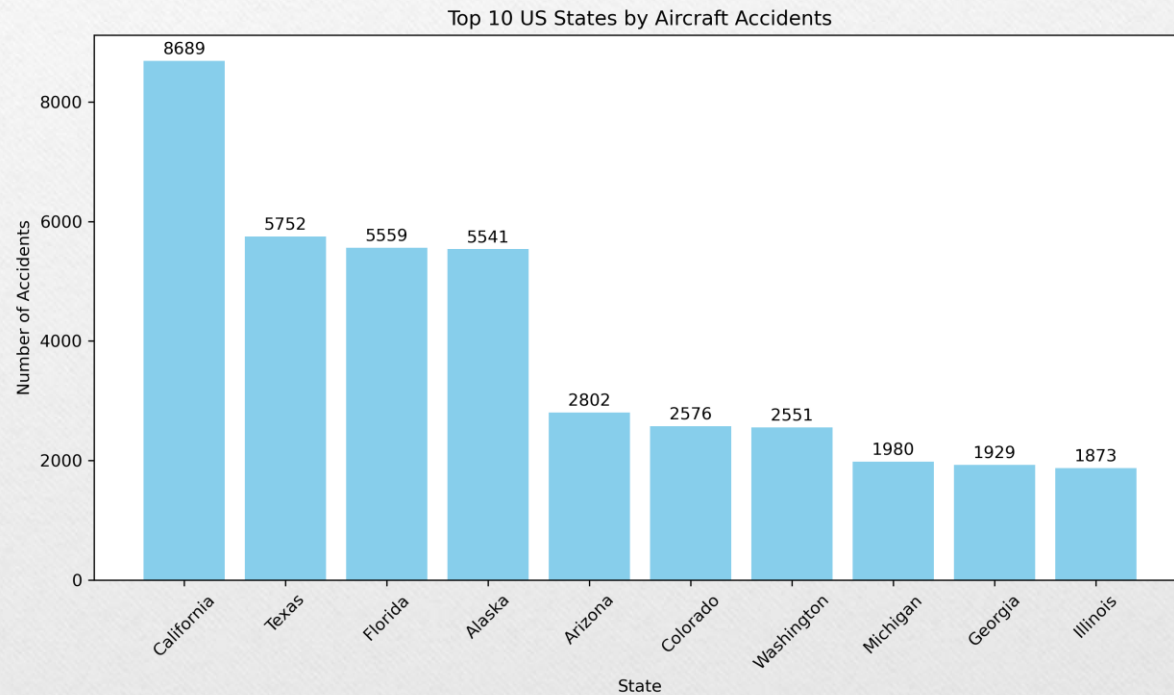
States with Most Accidents

California, Texas, Florida top the list

These states present higher operational risk

→ To reduce risk:

- Prioritize lower-risk states
- Improve training, maintenance, and oversight in risk zones








✓ General Conclusion

- Fewer accidents and injuries since 2000
- Major manufacturers are more exposed, not less safe
- Severity depends on aircraft type, context, and passenger count
- Weather is not a primary accident factor

✈ Recommendations

- **Start with Cessna or Piper:** reliable, well-documented, lower severity per accident
- **Avoid lesser-known small manufacturers:** higher severity risk
- **Strengthen pilot training** (VMC and IMC conditions)
- **Operate in low-risk states;** if not possible, apply enhanced safety protocols

Next Steps for Stakeholders

-  Include accident rate analysis (per flight/hour) for performance evaluation
-  Target high-risk areas to enhance local safety
-  Improve pilot training, especially in IMC
-  Promote safety tech innovations for small aircraft
-  Build reporting systems based on severity, not just frequency
- Promote data transparency among manufacturers, operators, and regulators

END