AIRCRAFT RISK ANALYSIS FOR SAFER AVIATION

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TITLE : COMPUTER INGINEER

PROJECT OVERVIEW

Goal :

Identify low-risk aircraft for acquisition and operation in commercial and private aviation sectors

Approach :

- Clean and analyze historical accident data
- Visualize trends over time and across aircraft types
- Recommend the 3 safest aircraft models

Tools used :

- **Python** for data cleaning and preparation
- **PowerBI** for interactive dashboard

BUSINESS UNDERSTANDING

Problem :

The company lacks expertise in aviation risk. What aircraft are **lowest rick** for commercial and private use ?

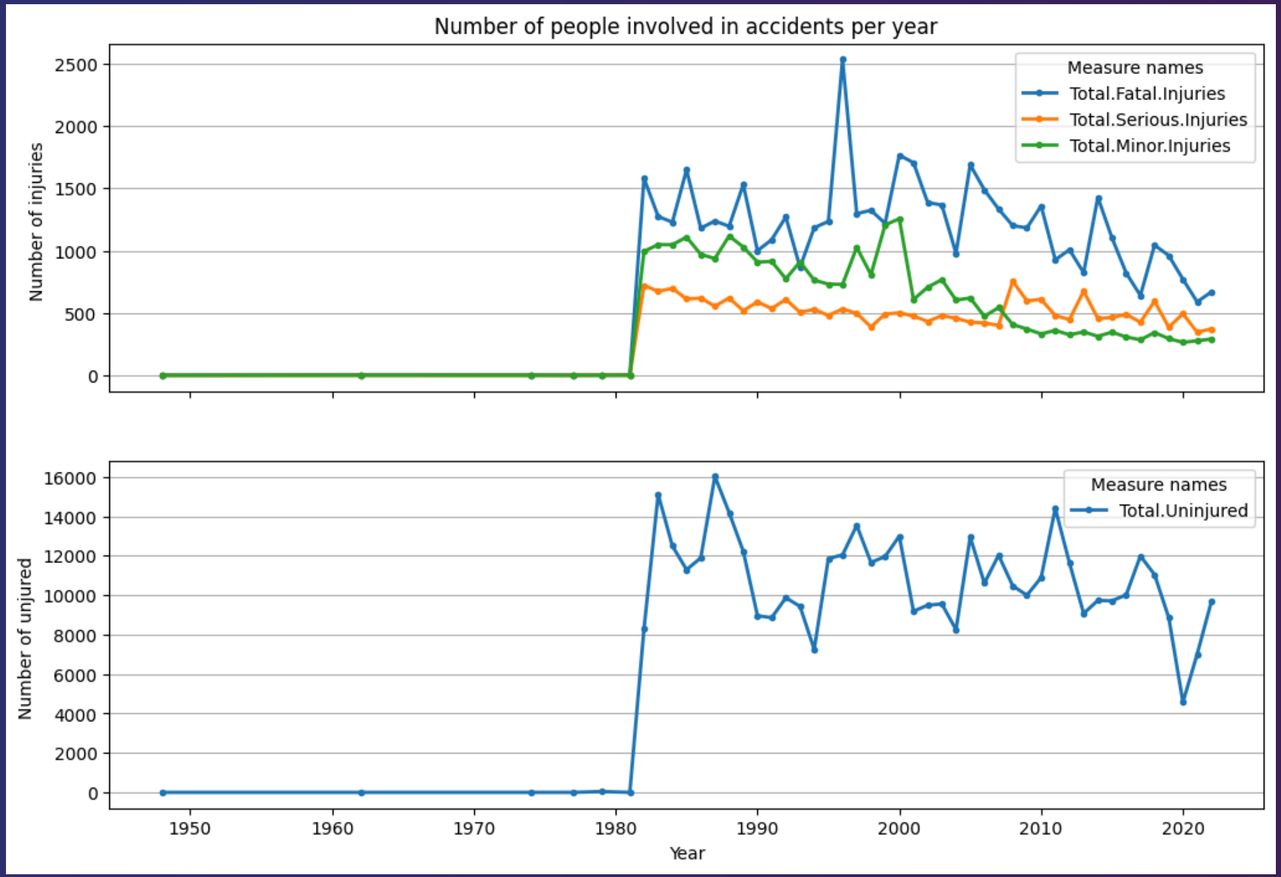
Opportunity :

- Avoid high-risk investments
- Enhance reputation & passenger safety
- Minimize long-term operational costs

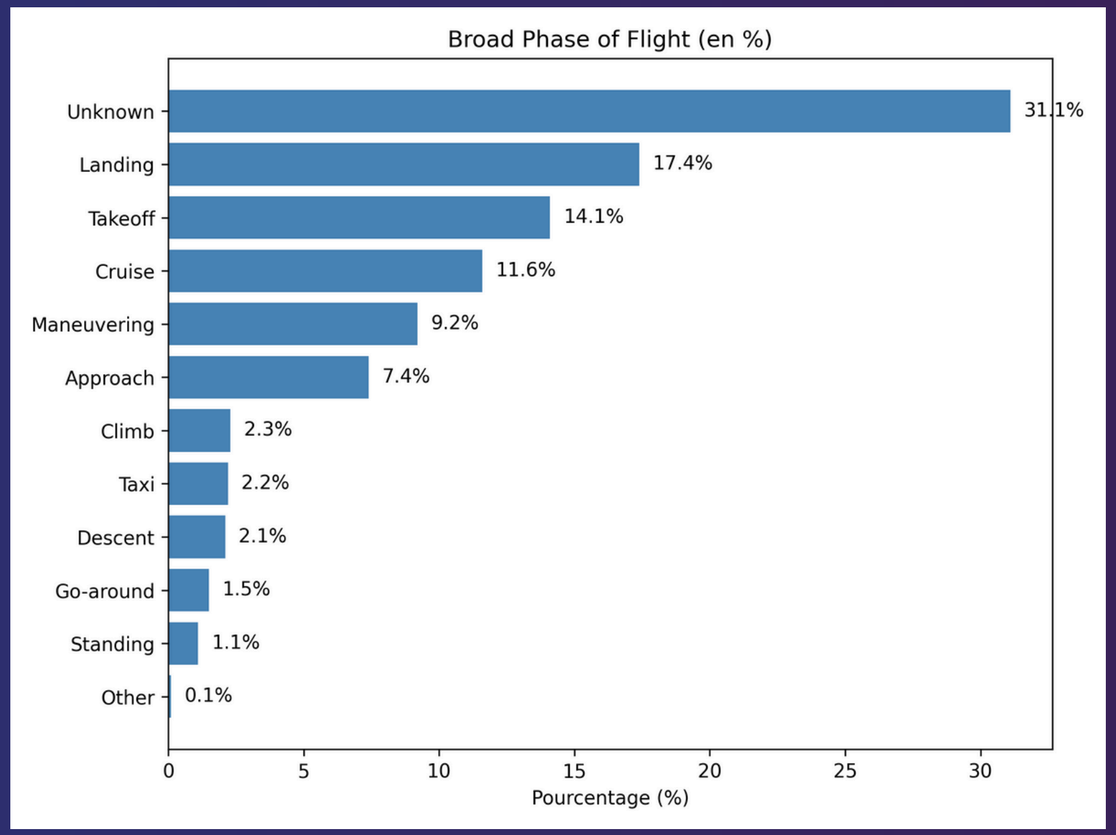
DATA UNDERSTANDING

- Source: U.S. National Transportation Safety Board accident reports
- Time span: 1948 –2022
- Size: 88 777 accident records
- What's inside: Make, Model, Fatal injuries, Total Unijured, Broad of phase, etc...
- Quality check: Some typos and missing values—cleaned before analysis.

DATA INTERPRETATION

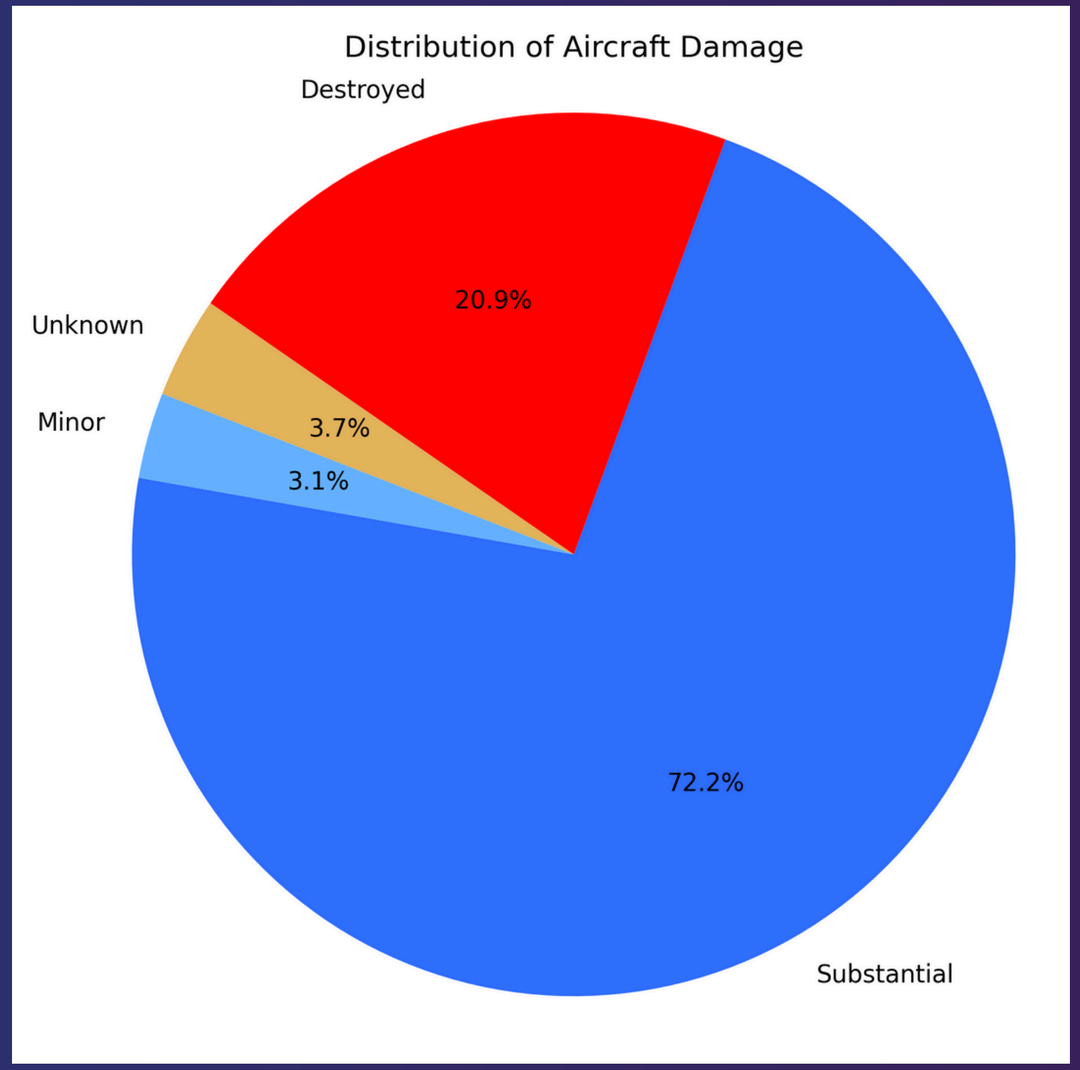


One can notice a strong interannual variability in the number of people injured in accidents from 1982 to 2022. This variability is particularly pronounced for fatal injuries, with significantly high peaks around 1985 and a gradual decline afterward. For serious and minor injuries, it can be observed that they follow an almost similar trend, but these injuries decrease over the years. Overall, fatal injuries are mostly higher than serious and minor injuries but decrease progressively, while the number of uninjured individuals generally increases compared to serious and fatal injuries.



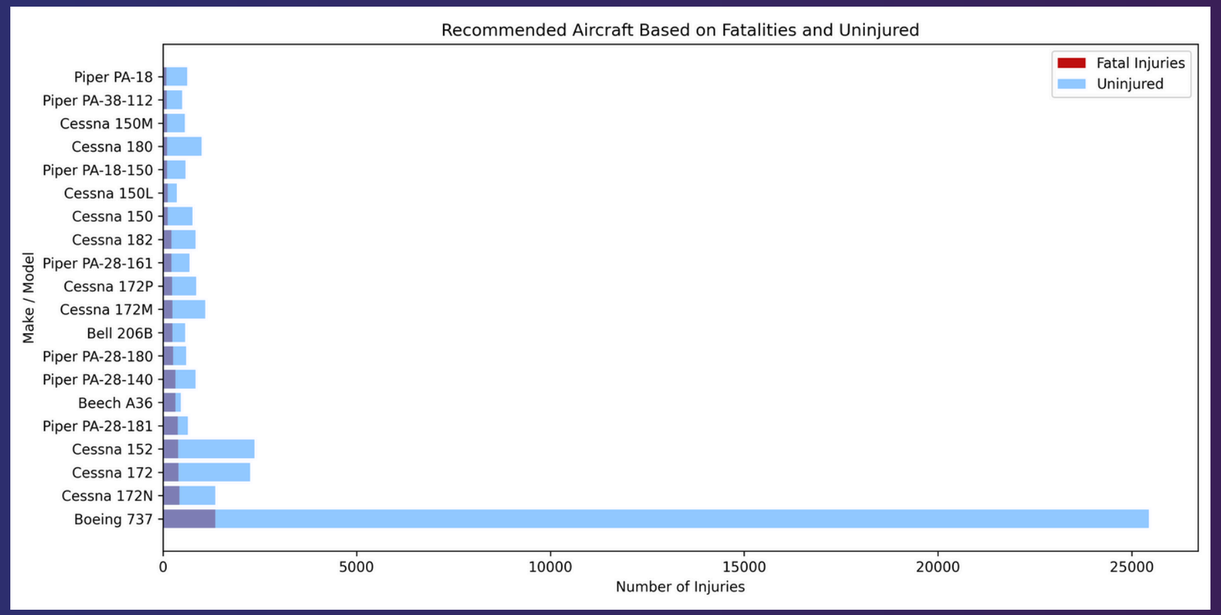
KEY INSIGHT 1:
WHEN ACCIDENTS HAPPEN

- Most accidents occur during landing, Cruise, or takeoff.
- Action: Prioritise pilot training and safety systems for these phases.



KEY INSIGHT 2:
DAMAGE LEVELS

- Regarding the number of accidents recorded over the years, we observe that most aircraft either sustain **substanciel** damage (72.2%) or are **destroyed** (20.9%). Only 3.1% of incidents result in minor damage, while 3.7% remain of unknown severity.



AIRCRAFT RECOMMENDATION

- Based on my analysis of historical accident data and aircraft status, I recommend the following three **aircraft models** as the safest and most viable options for commercial and private aviation operations. Our selection combines **low fatality ratios**, **ongoing active service**, and **favorable reputations**, supported by both **data** and **external research**.

AIRCRAFT RECOMMENDATION 1 :

- Boeing 737 — Commercial Backbone with Ongoing Oversight
  - Fatality Rate: 4.9% (1,348 fatalities out of 27,268 people involved)
  - Current Use: Active worldwide in thousands of commercial fleets
  - Reputation: Reliable, with strong safety record over decades

AIRCRAFT RECOMMENDATION 2 :

- Cessna 180 — Rugged Option for Utility Missions
  - Fatality Rate: 8.3% (103 fatalities out of 1,241 people involved)
  - Current Use: Flown by private pilots, charter operators, and for bush flying
  - Reputation: Durable and capable in remote or off-airport environments

AIRCRAFT RECOMMENDATION 3 :

- Piper PA-18 Super Cub — Safe for Training and Recreational Use
  - Fatality Rate: 9.9% (88 fatalities out of 890 people involved)
  - Current Use: Common in flight training, banner/glider towing, and personal flying
  - Reputation: Stable at low speeds and effective in emergency landings

NEXT STEP

Cross-check results with real-world fleet performance data

Schedule aircraft inspections and safety audits

Use findings to negotiate better insurance terms

NEXT STEP

QUESTIONS ?

THANK YOU!

DATA ANALYSIS IS KEY TO BUSINESS GROWTH AND SUCCESS!

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