

Aircraft Safety Analysis

A Data-Driven Approach to Minimizing Aircraft Risk

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Business Understanding

The goal is to identify low-risk aircraft based on accident data from NTSB, helping the company in making informed purchasing decision for commercial aircraft.

- Objectives :
- Understand injury patterns in accidents.
- Determine the safest aircraft makes and models for purchase by the company
- Provide actionable business recommendations based on the data.

Data Understanding

Dataset:

Accident records from NTSB Aircraft
Accident Data (1962–2023)

- **Key variables:**
- Injury severity : fatal, minor, serious, uninjured
- Aircraft category : airplane, helicopter, balloon, gyrocraft, glider
- Aircraft damage : destroyed, minor, substantial
- Engine type : reciprocating, turbo prop, turbo shaft, turbo fan, turbo jet, LR, electric
- Number of engines : single, twin, multi-engine
- Aircraft make and model : Beech A36, Piper PA-18, Cessna 182P etc

Data Analysis

- We analyzed 61 years of accident data through visualisations and statistical methods , that is, the data was cleaned, aggregated and visualization techniques were used to uncover the insights. This uncovered patterns in injury severity, aircraft category and damage, the number of engine and their types, the aircraft make and model and also the broad phase of flight.

Visualization 1

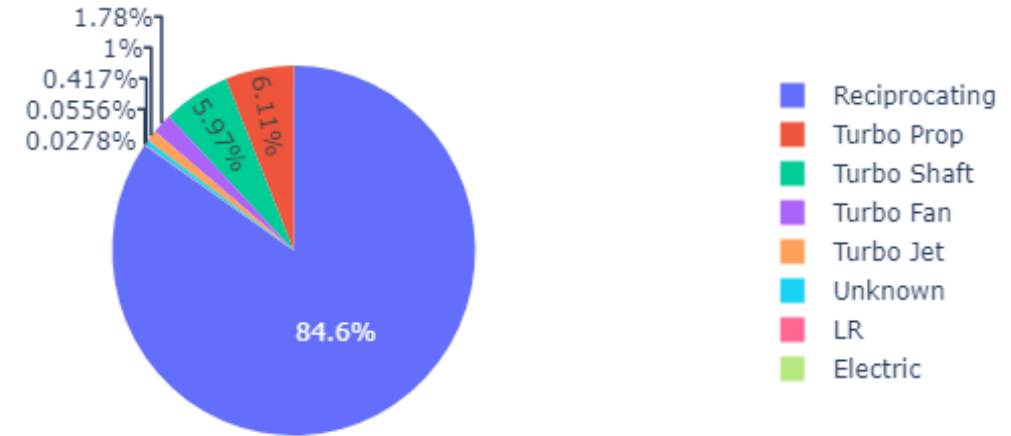
Engine Types

Title : Distribution of Engine Types involved in Accidents.

Chart type : Pie chart showing the number of engine types involved in the accidents.

Key insights : Reciprocating is involved in more accidents compared to electric, which is the least involved in accidents. This indicates a potential lower accident risks when electric is used.

Distribution of Engine Types Involved in Accidents



Visualization 2

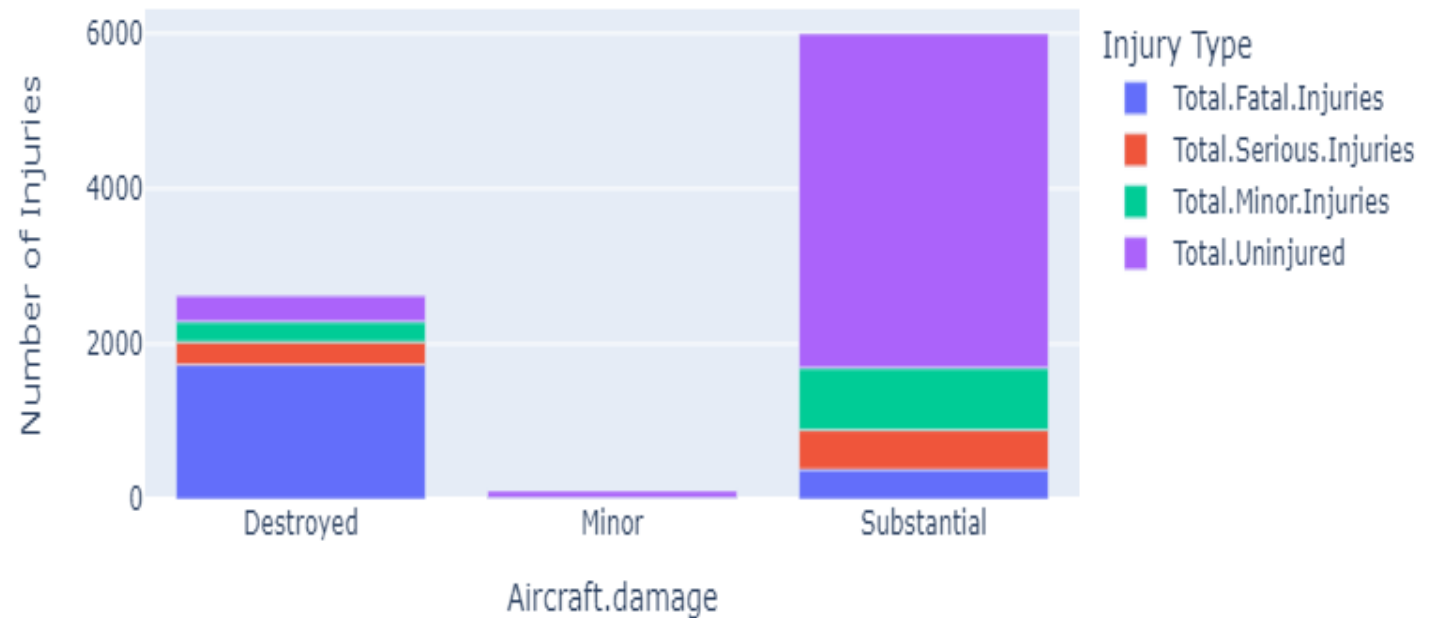
Injuries by Aircraft Damage

Title : Injuries by Aircraft Damage Type

Chart type : A grouped bar graph comparing the number of injuries (fatal, serious, minor and uninjured) across aircraft damage.

Key insights : the aircrafts that were destroyed had so many numbers of fatal injuries. The aircrafts with minor damage had no records of the injured with only a few uninjured. The aircraft with substantial damages had more uninjured compared to the two thus safer.

Injuries by Aircraft Damage Type



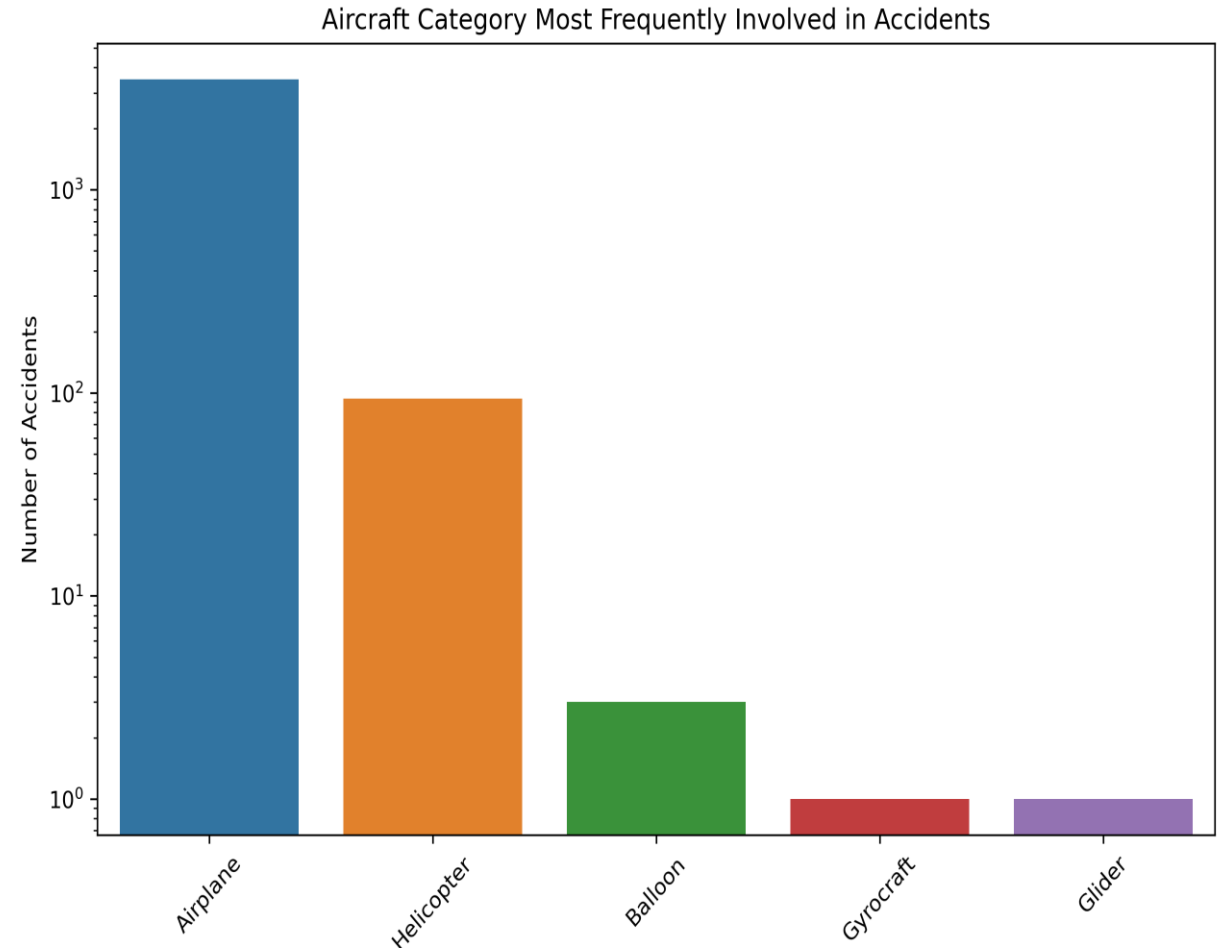
Visualization 3

Aircraft category

Title : Aircraft Category Most Frequently Involved in Accidents

Chart type : A bar chart comparing the number of accidents against aircraft category.

Key insights : Airplanes frequently get involved in accidents. It has the most number of accidents



Visualization 4

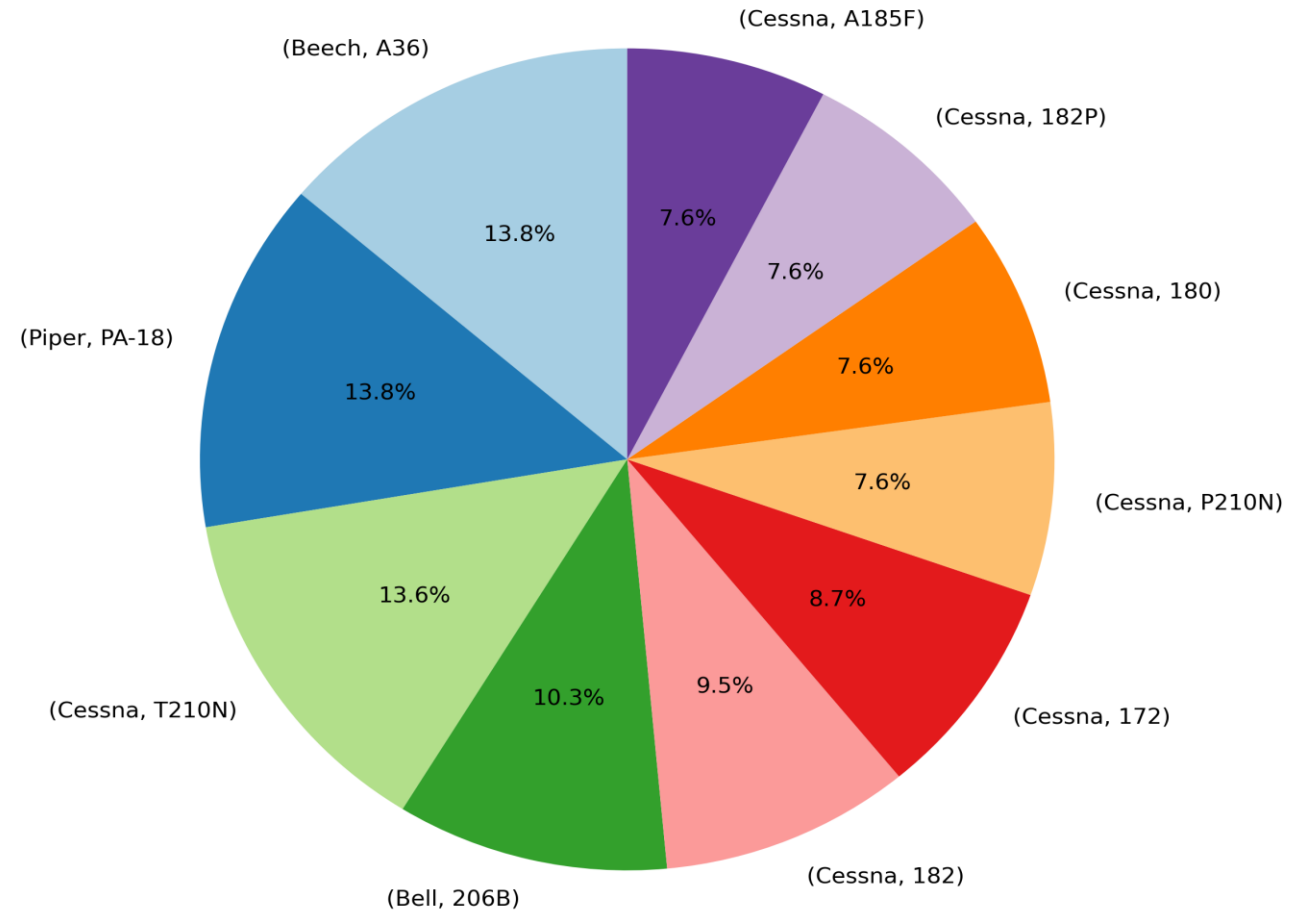
Aircraft make and models

Title : Top 10 Aircraft Make and Models Involved in Accidents

Chart type : A pie chart showing the top 10 aircraft make and models involved in accidents.

Key insights :Piper, PA-18 and Beech, A36 are involved in more accidents compared to Cessna P210N, 180, 182P and A185F. This shows that there will be fewer number of accidents when Cessna P210N, 180, 182P and A185F are used.

Top 10 Aircraft Make and Models Involved in Accidents



Recomendations

1.Focus on aircrafts with electric engines :

opt for the aircrafts with electric engines since they are involved in the least number of accidents.

2.Priotize aircrafts with less damages :

less damaged aircrafts have more uninjured passengers hence a guarantee for a safer flight and fewer accidents.

3.Target specific aircraft make and models :

invest in aircrafts that have consistently shown lower injury severity rates like Cessna P210N, 180, 182P and A185F.

4.Target specific aircraft category :

priotize safer categories like helicopters, balloons .

Next steps

- **Further Analysis :**

Conduct simulations with more recent aircraft make and models and integrate operational data from other regions.

- **Ongoing Monitoring :**

Implement a periodic review of aviation safety records to refine aircraft selection and safety protocols.

Thankyou

- Q &A :

Any questions?

- Contact information :

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