

# Aviation Incidents Data

Enhancing Safety Through Data Insights

Jeremiah Rubin



## Overview

The Aviation Incidents Analysis project aims to provide a comprehensive examination of recent aviation incidents to enhance safety and operational efficiency. This analysis will help the Safety Director at Global Airways understand the factors contributing to incidents and develop strategies to mitigate risks, ultimately improving overall flight safety and regulatory compliance.

# Outline

- Overview
- Business Understanding
- Data Understanding
- Data Analysis
- Recommendations
- Limitations
- Next Step

# Business Understanding

— — —

- Improve Safety Measures
- Optimize Operational Efficiency
- Enhance Compliance and Risk Management
- Strengthen Stakeholder Confidence



# Data Understanding

— — —

The dataset comprises **90,348** entries related to aviation accidents.

Key attributes include:

- **Make**(aircraft manufacturers)
- **Aircraft Category**(focus on "Airplanes")
- **Number of Engines**(engine counts)
- **Injury Severity**(injury reports)

# Data Understanding

---

**Aircraft Category Count: Total Airplanes: 27,617(out of 90,348)**

**Number of Engines:**

**1 Engine: 21,176**

**2 Engines: 3,515**

**4 Engines: 103**

**Top Engine Types:**

**Reciprocating: 20,715**

**Turbo Prop: 1,366**

**Turbo Fan: 970**

**Turbo Jet: 158**

# Data Understanding

— — —

## Injury Severity Breakdown:

- **Non-Fatal: 21,063**
- **Fatal: 4,238**
- **Minor: 165**
- **Serious: 127**

## Popular Aircraft Makes:

- **Cessna: 3,608 incidents**
- **Piper: 1,910 incidents**
- **Beech: 674 incidents**
- **Boeing: 287 incidents**

# Data Understanding

```
# Narrowing down the dataset to 4 columns
```

```
aviation_data = aviation_data[['Make', 'Aircraft.Category', 'Number.ofEngines', 'Engine.Type', 'Injury.Severity']]
```

```
aviation_data.head()
```

	Make	Aircraft.Category	Number.ofEngines	Engine.Type	Injury.Severity
5	Mcdonnell Douglas	Airplane	2.0	Turbo Fan	Non-Fatal
7	Cessna	Airplane	1.0	Reciprocating	Non-Fatal
8	Cessna	Airplane	2.0	Reciprocating	Non-Fatal
12	Bellanca	Airplane	1.0	Reciprocating	Non-Fatal
13	Cessna	Airplane	1.0	Reciprocating	Fatal(1)



# Data Preparation

— — —

Data Cleaning:

- Dropped NaN and duplicates
- Selected Columns: Make, Aircraft Category, Number of Engines, Engine Type, Injury Severity.

# Data Preparation

```
# Narrowing down the dataset to 4 columns
```

```
aviation_data = aviation_data[['Make', 'Aircraft.Category', 'Number.ofEngines', 'Engine.Type', 'Injury.Severity']]
```

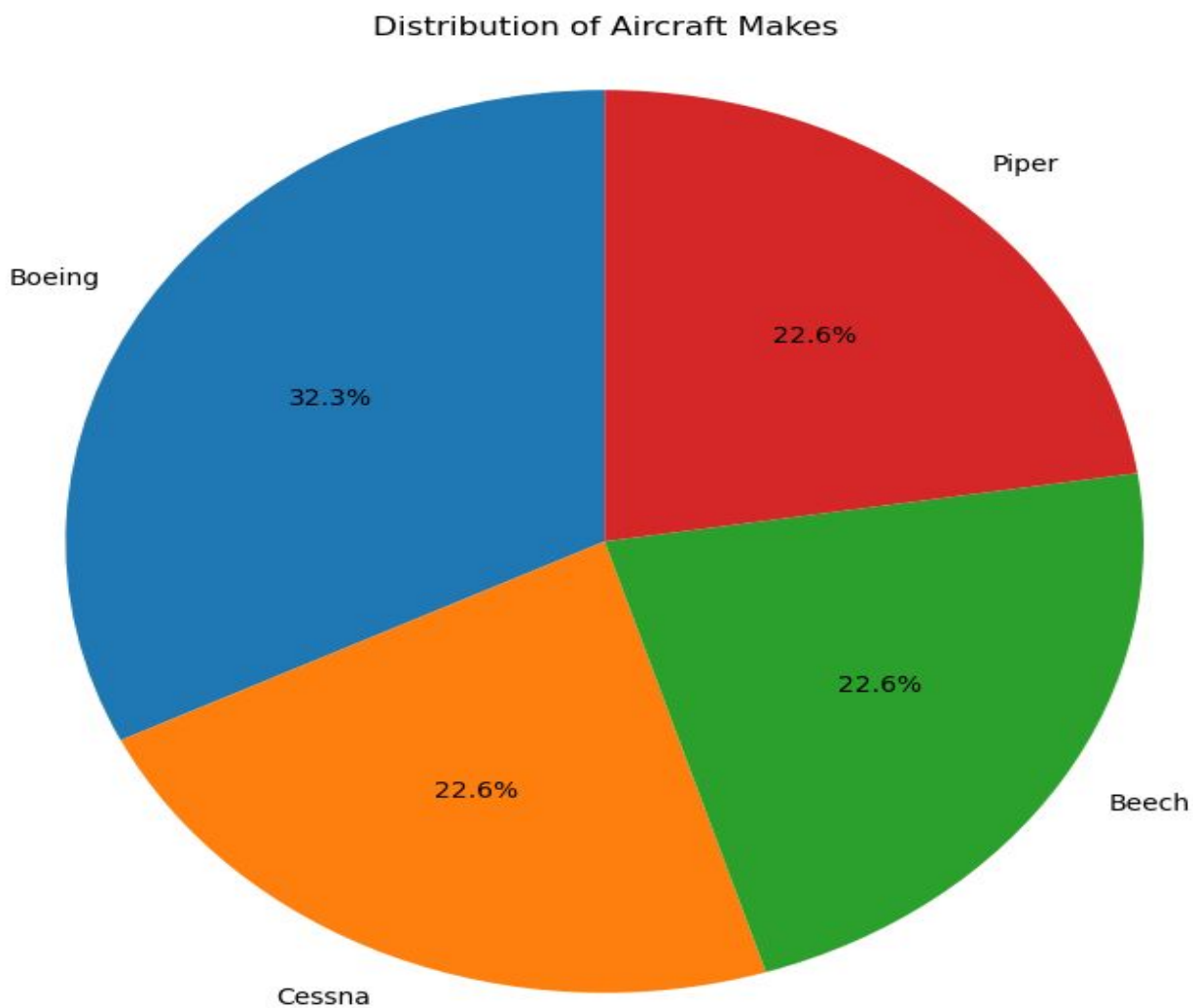
```
aviation_data.head()
```

	Make	Aircraft.Category	Number.ofEngines	Engine.Type	Injury.Severity
5	Mcdonnell Douglas	Airplane	2.0	Turbo Fan	Non-Fatal
7	Cessna	Airplane	1.0	Reciprocating	Non-Fatal
8	Cessna	Airplane	2.0	Reciprocating	Non-Fatal
12	Bellanca	Airplane	1.0	Reciprocating	Non-Fatal
13	Cessna	Airplane	1.0	Reciprocating	Fatal(1)

# Exploratory Data

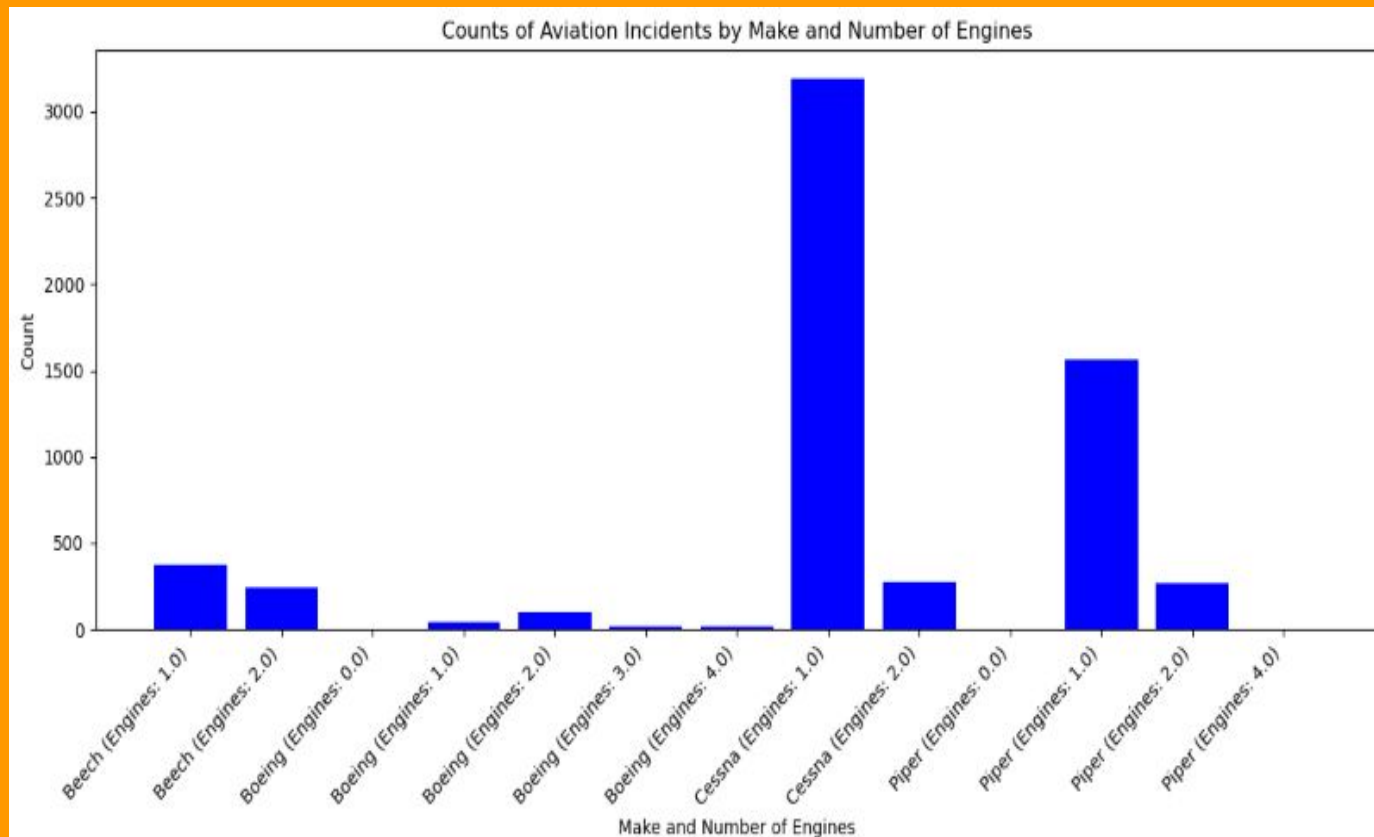
— — —

## The Distribution Of Aircraft Makes



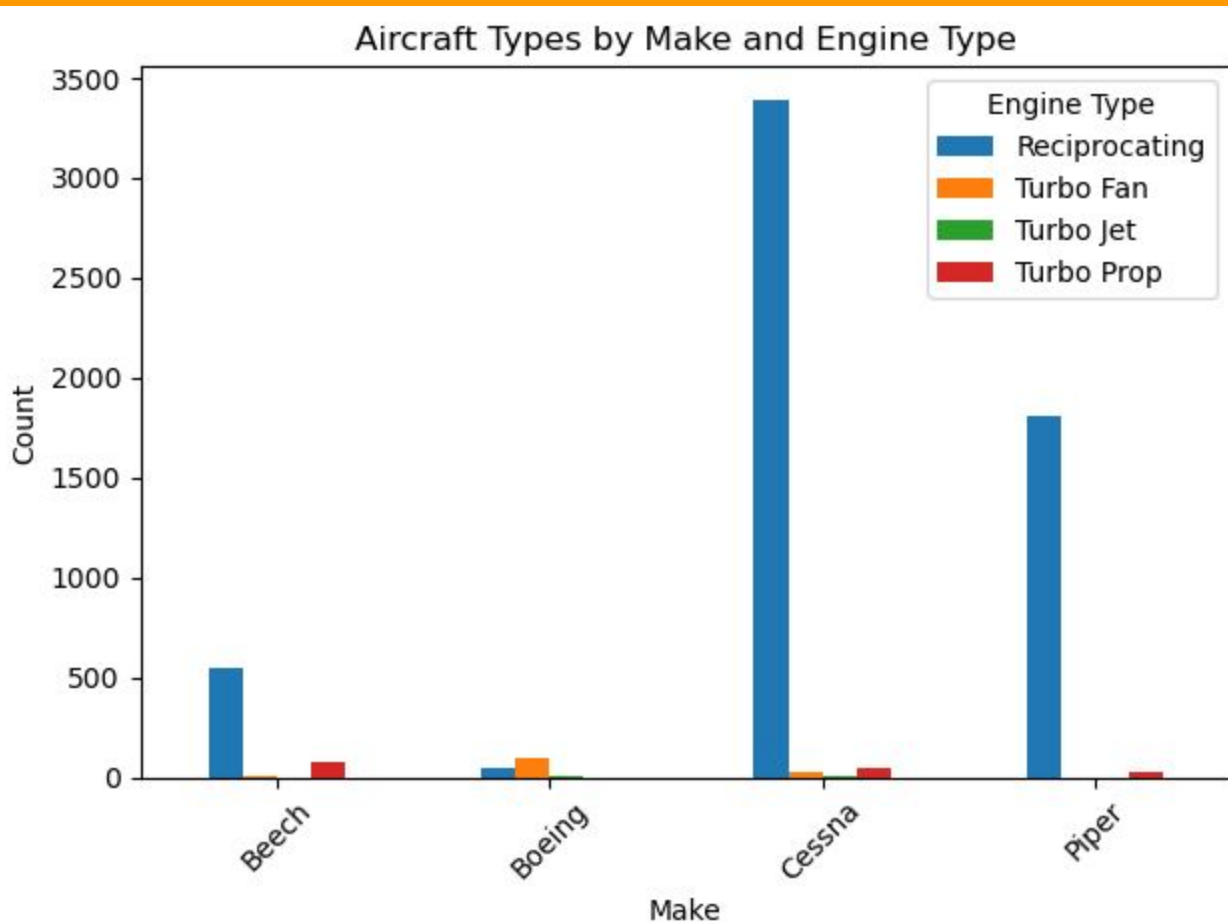
# Exploratory Data

Incident counts  
by  
Make and  
Number of  
Engines



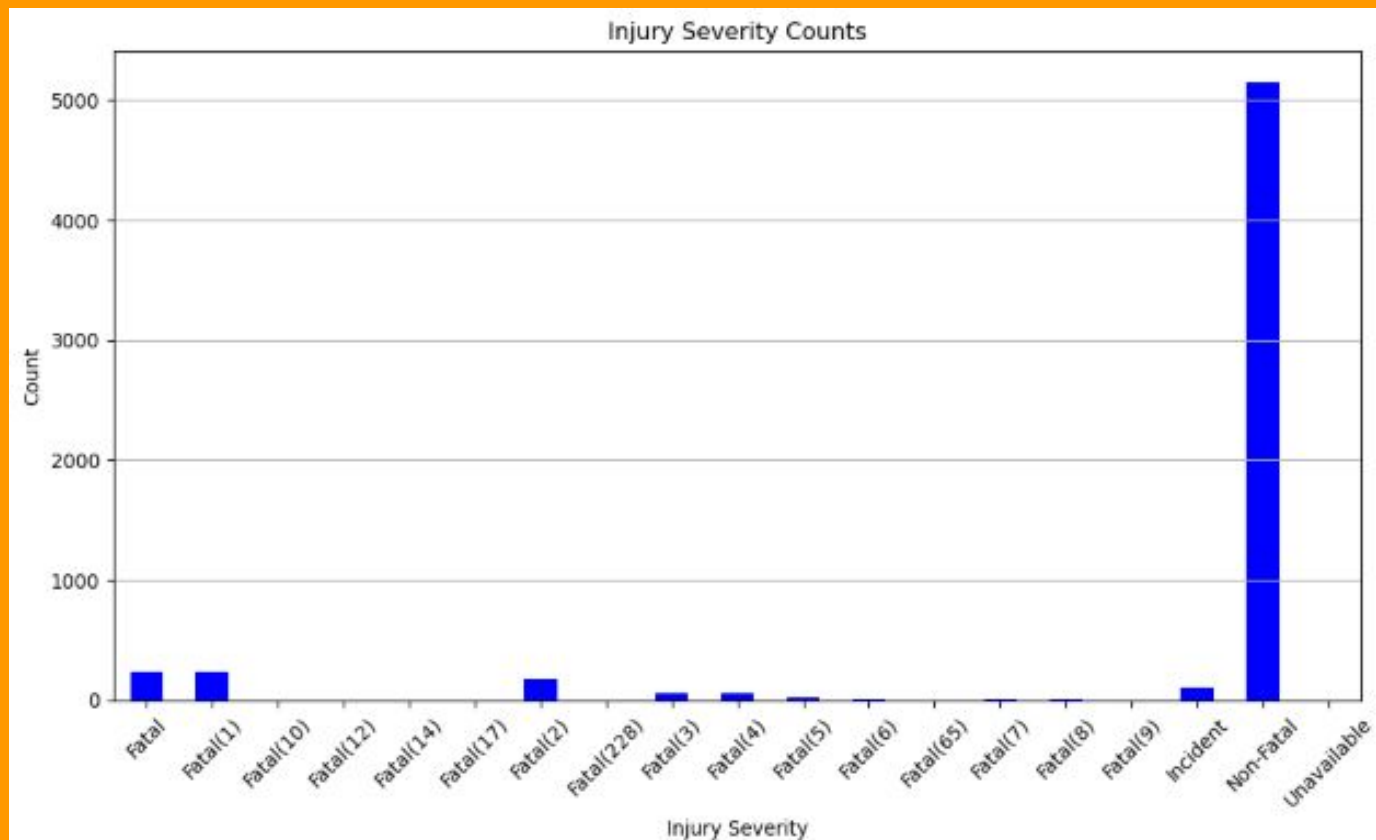
# Exploratory Data

Breakdown of  
aircraft types by  
make and  
engine type



# Exploratory Data

Counts of  
Injury Severity



# Conclusions

— — —

- The analysis of aviation incidents provides valuable insights into the trends and patterns within the dataset. Visualizations highlight how different aircraft categories and engine types correlate with incident frequency, enabling stakeholders to identify potential risk factors.

# Limitation

---

- **Data Completeness:** The analysis relies on the accuracy and completeness of the dataset.
- **External Factors:** The analysis does not account for external factors such as weather conditions or pilot experience.
- **Generalization:** Findings may not be universally applicable across all regions or types of aviation operations.



# Recommendation

---

- **Targeted Safety Initiatives:** Develop initiatives focusing on aircraft categories and engine types with higher incident rates, including enhanced training for pilots and maintenance personnel.
- **Ongoing Monitoring:** Establish a continuous monitoring system to regularly analyze aviation incident data.
- **Data-Driven Decision Making:** Encourage aviation authorities to incorporate data analytics into their decision-making processes for safety improvements.

# Next Step

---

- Further Research: Conduct research to incorporate external factors influencing incident rates.
- Expand Analysis: Broaden the analysis to include more variables such as geographical regions and operational contexts.
- Stakeholder Engagement: Engage with industry stakeholders to disseminate findings and collaborate on safety initiatives.

# Thank you !

GitHub : @BlackXWulf

LinkedIn : [www.linkedin.com/in/jeremiah-r-025a391b6](https://www.linkedin.com/in/jeremiah-r-025a391b6)