Aircraft Accident Data Analysis

Insights and Recommendations

Business Problem

- The company is expanding into the aviation industry and needs to evaluate risks.
- Goal: Identify low-risk aircraft by analyzing accident data.
- Deliver actionable insights for the aviation division.

Data Cleaning

- 1. Identified and handled missing values.
- 2. Cleaned coordinates (latitude and longitude) with directional suffixes (e.g., 'N', 'S').
- 3. Filtered data to focus on valid entries.
- Outcome: Dataset prepared for analysis.

Variable with missing values

Schedule and Air_carrier Columns have the highest number of missing values, with bars extending the furthest on the x-axis.

Registration_Number, Make, and **Model** Columns have much shorter bars, indicating fewer missing values

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[7]: Text(0.5, 1.0, 'Variables with missing values')
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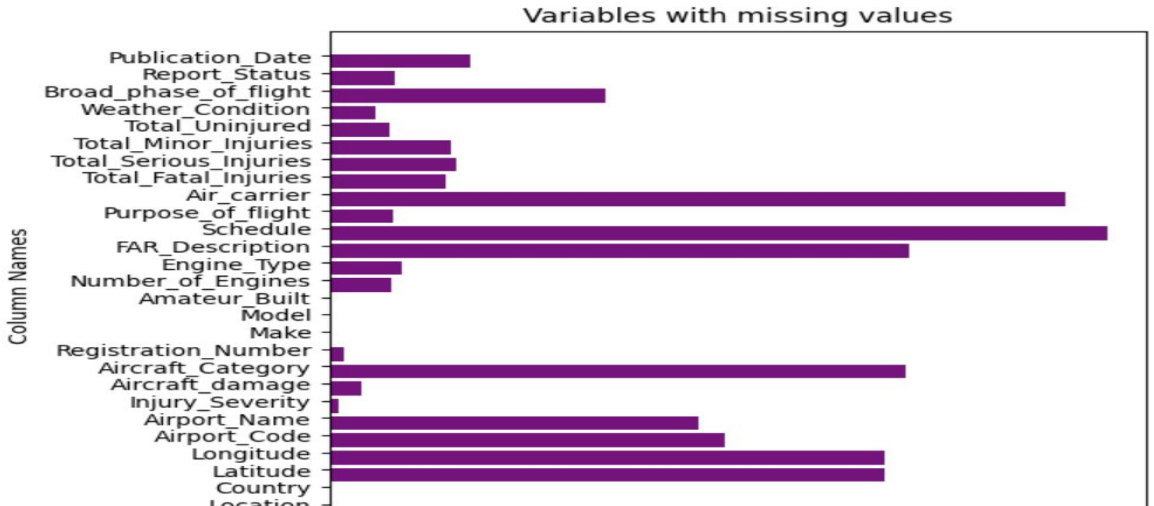
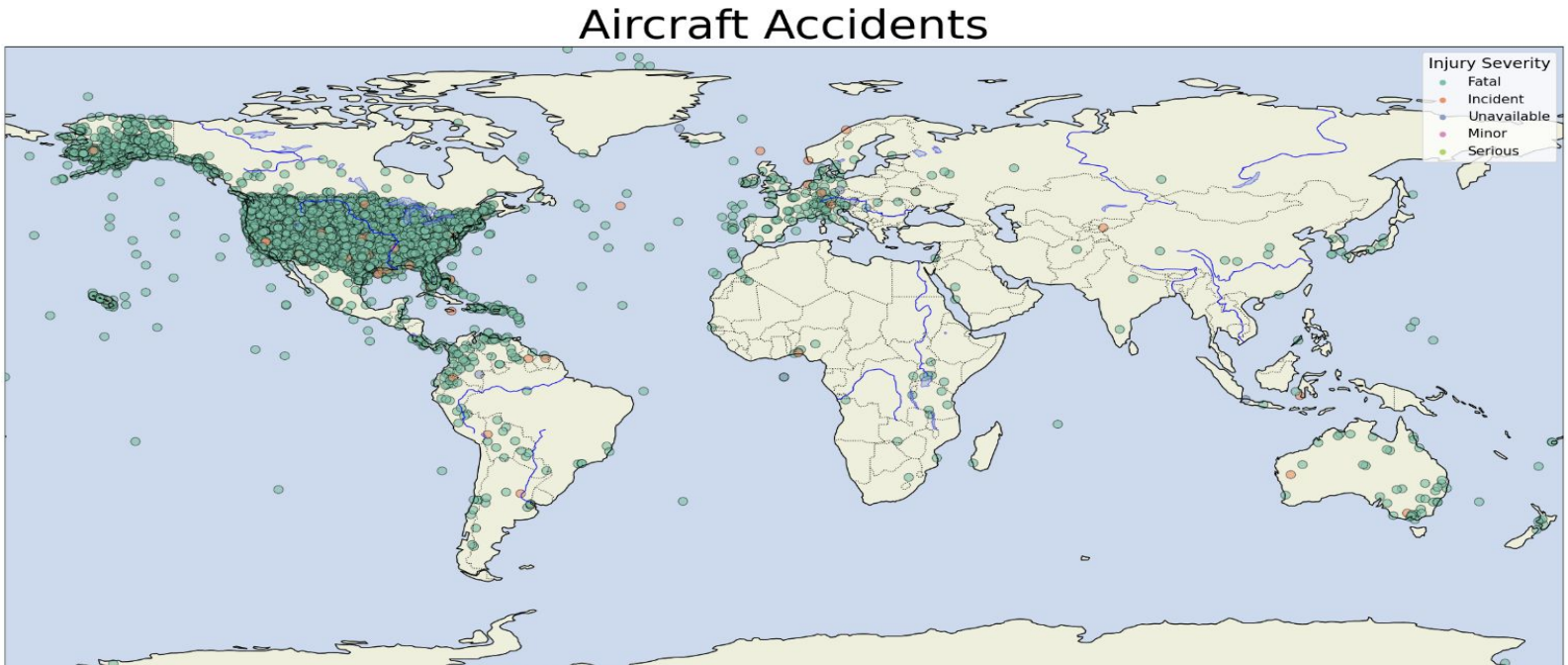


Exploratory Data Analysis (EDA)

- 1. Examined variables like:
- - Injury Severity
- - Flight Phase
- - Weather Conditions
- 2. Created visualizations to explore relationships.
- Outcome: Key patterns identified.

Aircraft Accident

- Colors are used to represent injury severities and fatalities.
- Most accidents are concentrated in North America and Europe, likely due to higher aviation activity in these regions.
- There are smaller insident in parts of Africa, South America, and Australia.



Weather based Accident

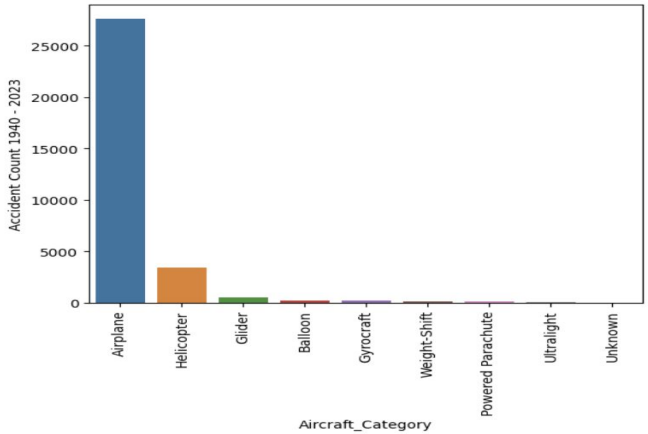
- Visual Meteorological Conditions (VMC) are present in most accidents, indicating clear weather.

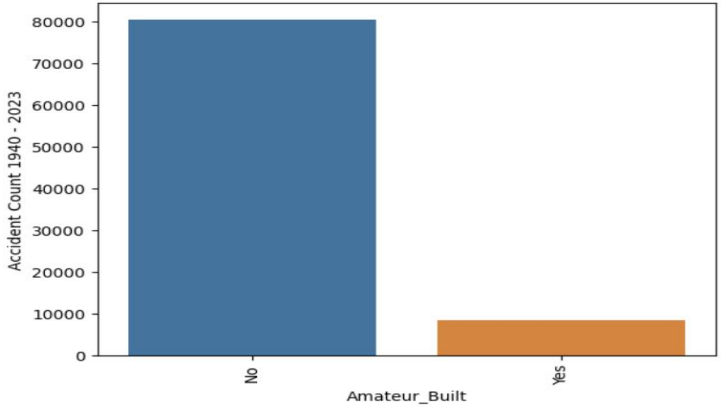
Insights and Recommendations

- 1. Aircraft models with fewer accidents are ideal candidates for investment.
- 2. Weather conditions and flight phases significantly impact accident risks.
- 3. Recommendations:
- - Focus on aircraft with low accident rates.
- - Prioritize training for critical flight phases

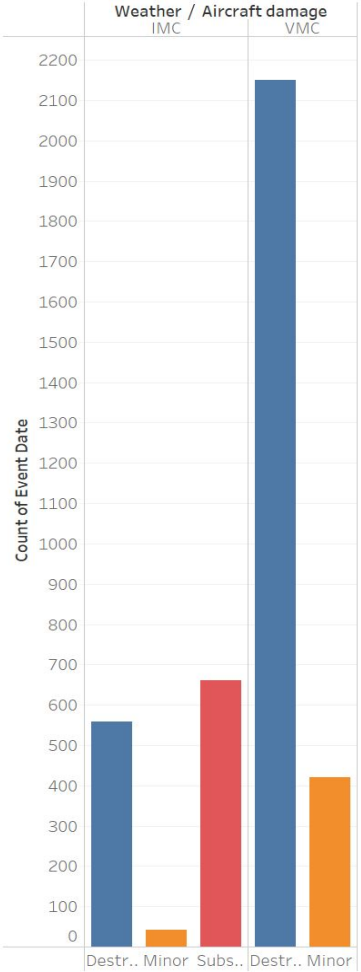
Aircraft Category

- Airplanes dominate the accident count.
- A vast majority of accidents involve non-amateur-built aircraft.





Aircraft Damage by Weather Conditions



Aircraft damage

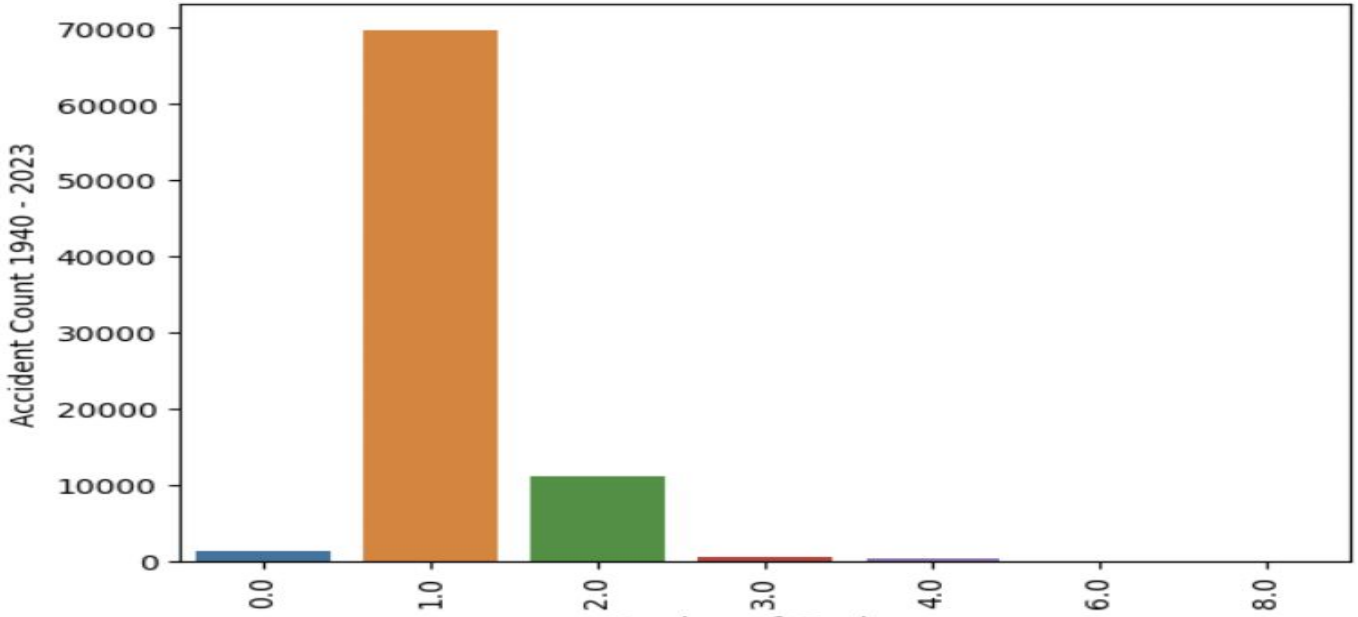
- Destroyed
- Minor
- Substantial

Aircraft damage

- [ ] (All)
- [x] Destroyed
- [x] Minor
- [x] Substantial
- [ ] Unknown

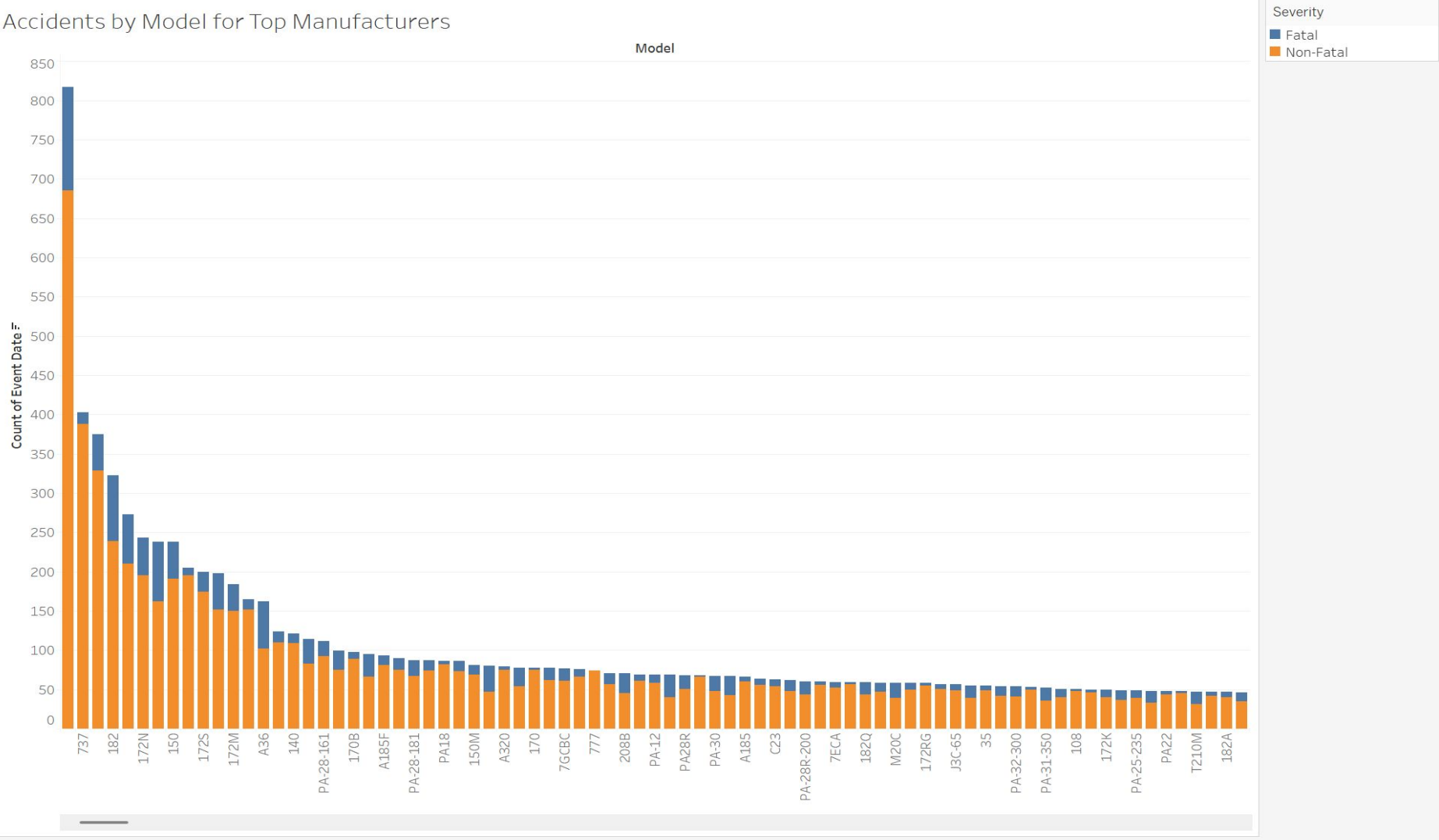
Aircraft Engine

- Aircraft with one engine dominate the accidents, followed by those with two engines more secure.

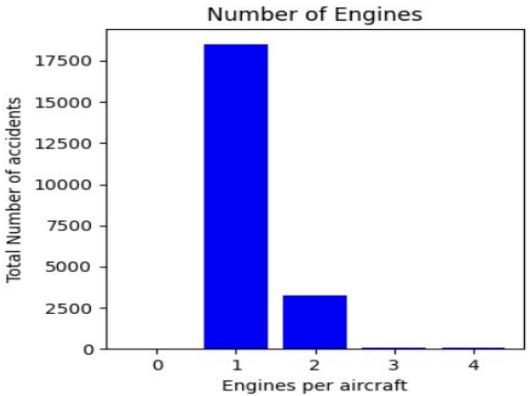


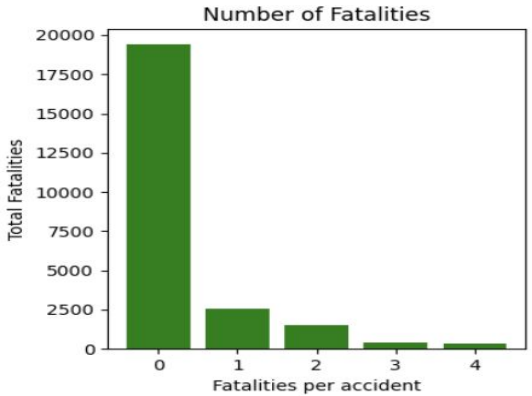
Next Steps

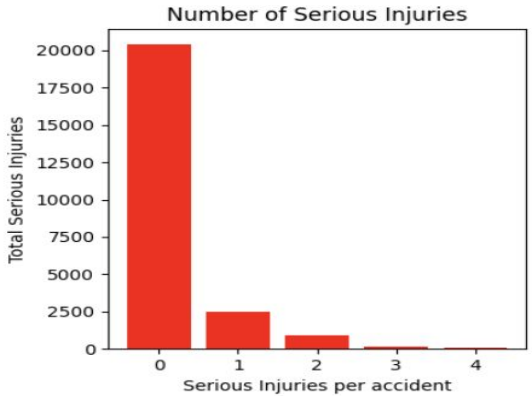
- 1. Deepen analysis on specific aircraft models and manufacturers.
- 2. Use the findings to guide strategic decisions in aviation investments.

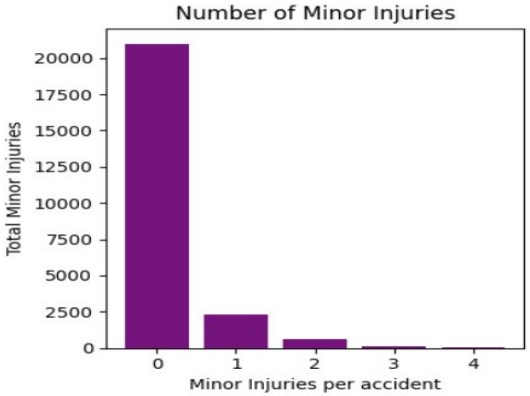

Accidents by Model for Top Manufacturers
Model
Count of Event Date
Severity
Fatal
Non-Fatal
850
800
750
700
650
600
550
500
450
400
350
300
250
200
150
100
50
0
737
182
172N
150
172S
172M
A36
140
PA-28-161
170B
A185F
PA-28-181
PA18
150M
A320
170
7GCBC
777
208B
PA-12
PA28R
PA-30
A185
C23
PA-28R-200
7ECA
182Q
M20C
172RG
J3C-65
35
PA-32-300
PA-31-350
108
172K
PA-25-235
PA22
T210M
182A

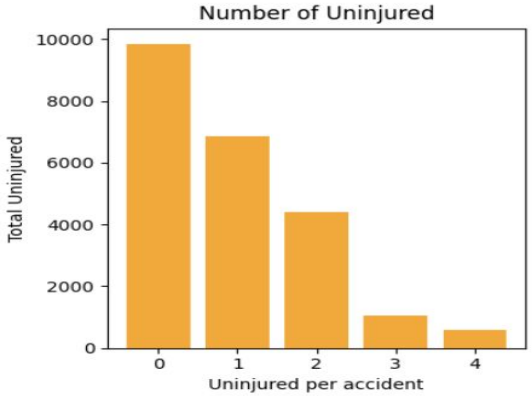
Analysis


Number of Engines
Total Number of accidents
0
2500
5000
7500
10000
12500
15000
17500
0
1
2
3
4
Engines per aircraft

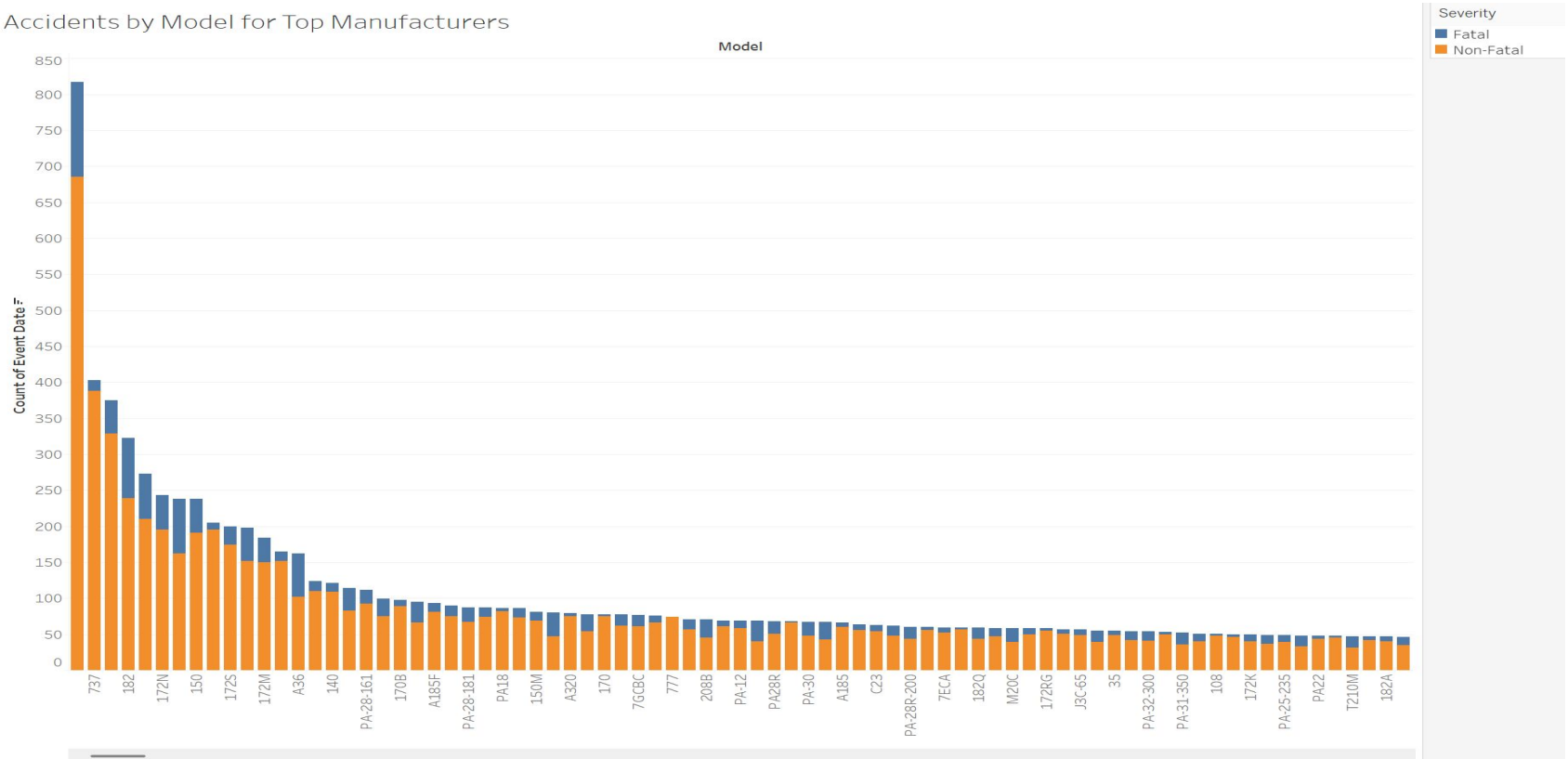

Number of Fatalities
Total Fatalities
0
2500
5000
7500
10000
12500
15000
17500
20000
0
1
2
3
4
Fatalities per accident


Number of Serious Injuries
Total Serious Injuries
0
2500
5000
7500
10000
12500
15000
17500
20000
0
1
2
3
4
Serious Injuries per accident

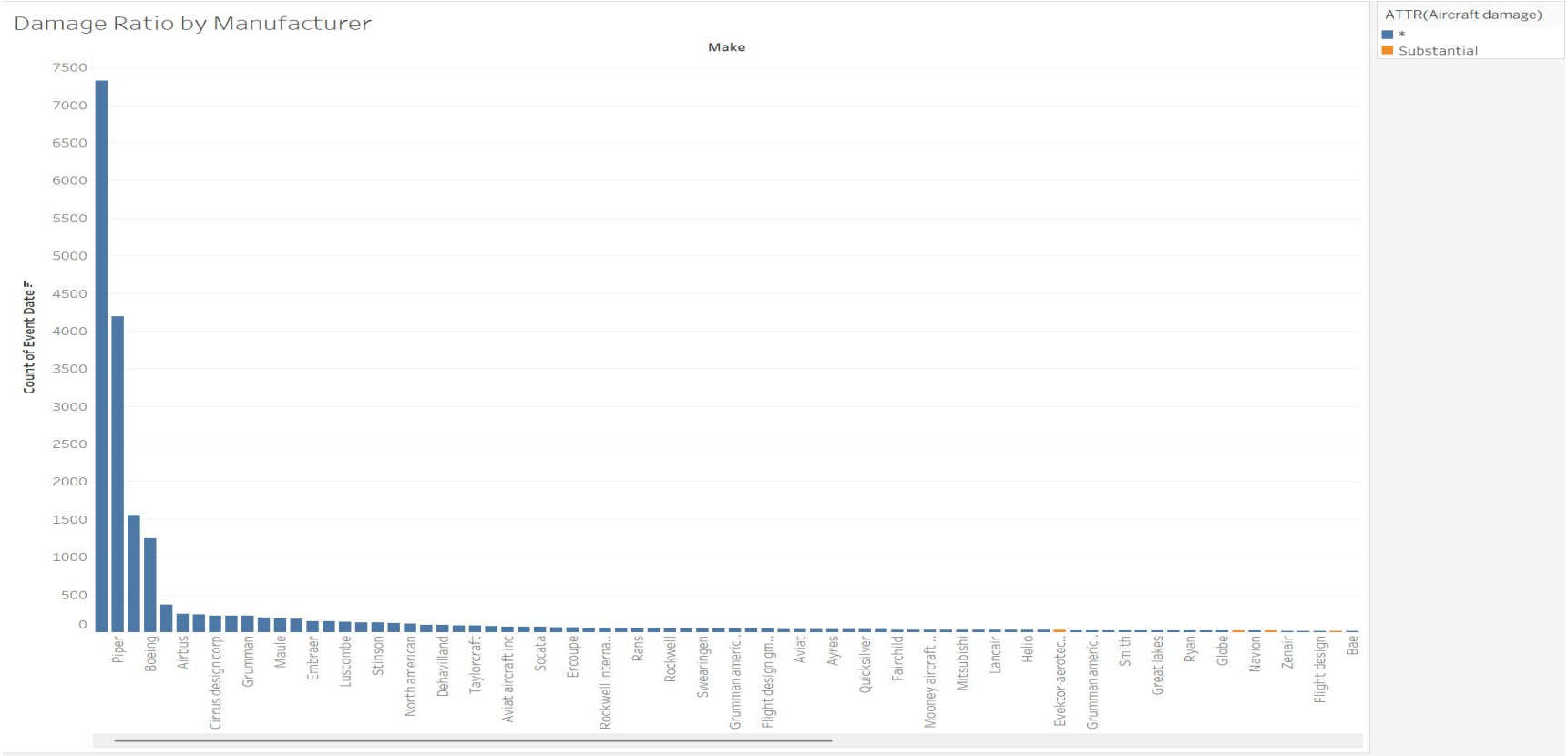

Number of Minor Injuries
Total Minor Injuries
0
2500
5000
7500
10000
12500
15000
17500
20000
0
1
2
3
4
Minor Injuries per accident


Number of Uninjured
Total Uninjured
0
2000
4000
6000
8000
10000
0
1
2
3
4
Uninjured per accident

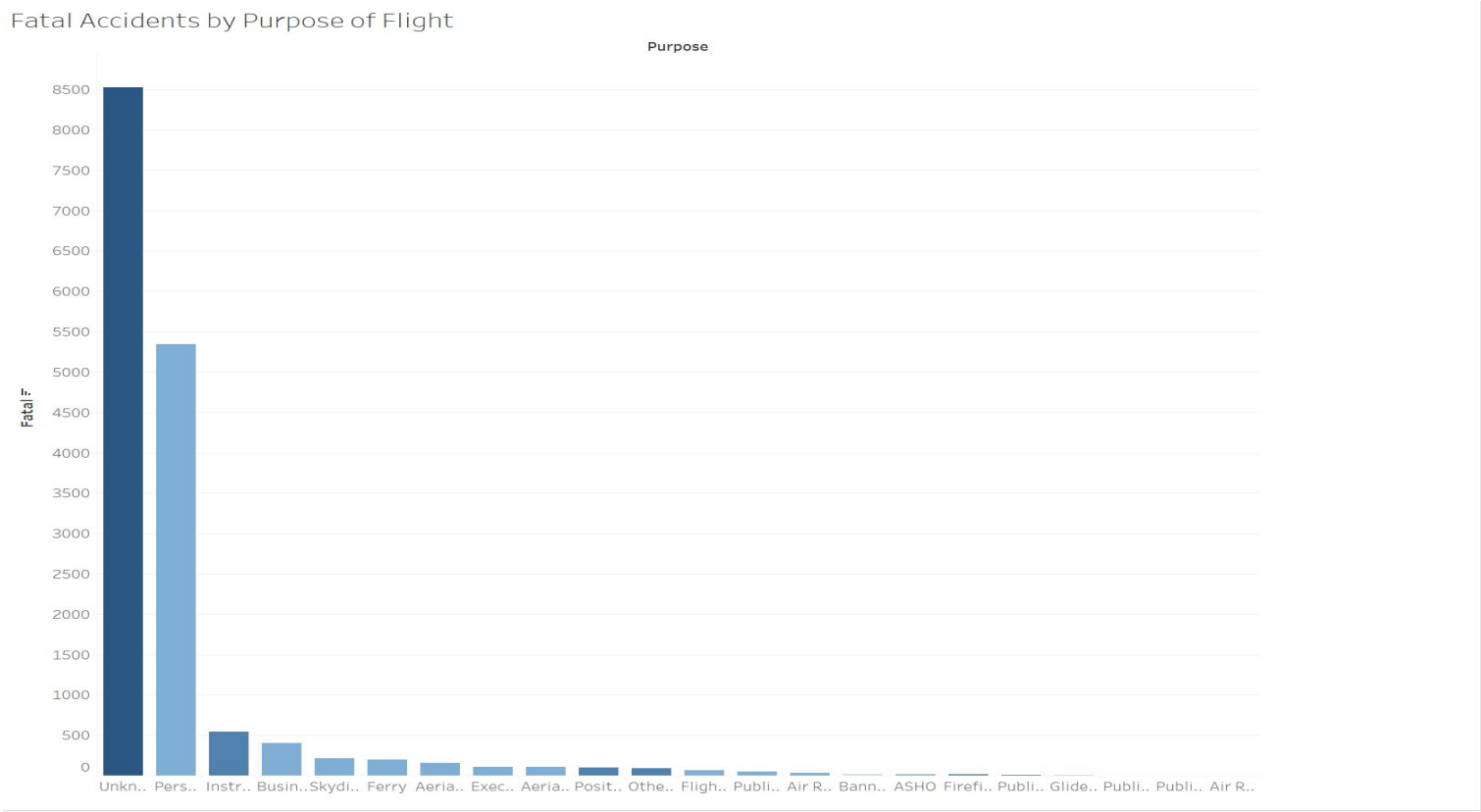
Accident by top model & Manufactured



Damage by Manufacture



Analysis by purpose of flight



Recommendation for Starting an Aircraft Business:

1. Best Engine Types:

- **Turbo Fan** or **Turbo Jet** engines are recommended due to their **low accident frequency** and proven reliability in modern aviation.
- **Turbo Prop** engines are also a strong option for small-to-medium aircraft, particularly for regional and cargo operations.

2. Manufacturer:

- Boeing
- Airbus
- Piper