
SAFER SKIES, RIGHT PURPOSE

Data-Driven Airplane Selection for Commercial
and Private Use

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PROJECT OVERVIEW

- This analysis explores the Aviation Accident Database & Synopses (1962–2023) from Kaggle, to support airplane selection decisions based on historical safety data.





PROJECT GOAL

- To identify the safest and most suitable aircraft for commercial and private operations by analyzing aviation accident trends.



BUSINESS UNDERSTANDING



- The company seeks to determine a low risk airplane to purchase, suitable both commercial and private operations.



BUSINESS UNDERSTANDING

This project explores four key questions to guide safe aircraft selection:

1. Aircraft Types & Classification
2. Safety Performance
3. Causes & Severity
4. Operational Suitability





DATA UNDERSTANDING

- **Source:** Kaggle- Aviation Accident Database & Synopses (1962–2023)
- **Format:** CSV file
- **Records:** 88,889 rows
- **Features:** 31 columns
 - 5 numerical features (floats)
 - 26 categorical features (strings/objects)



DATA CLEANING

Steps taken:

- Merging columns to relevant objectives
- Handling missing values
- Feature normalization



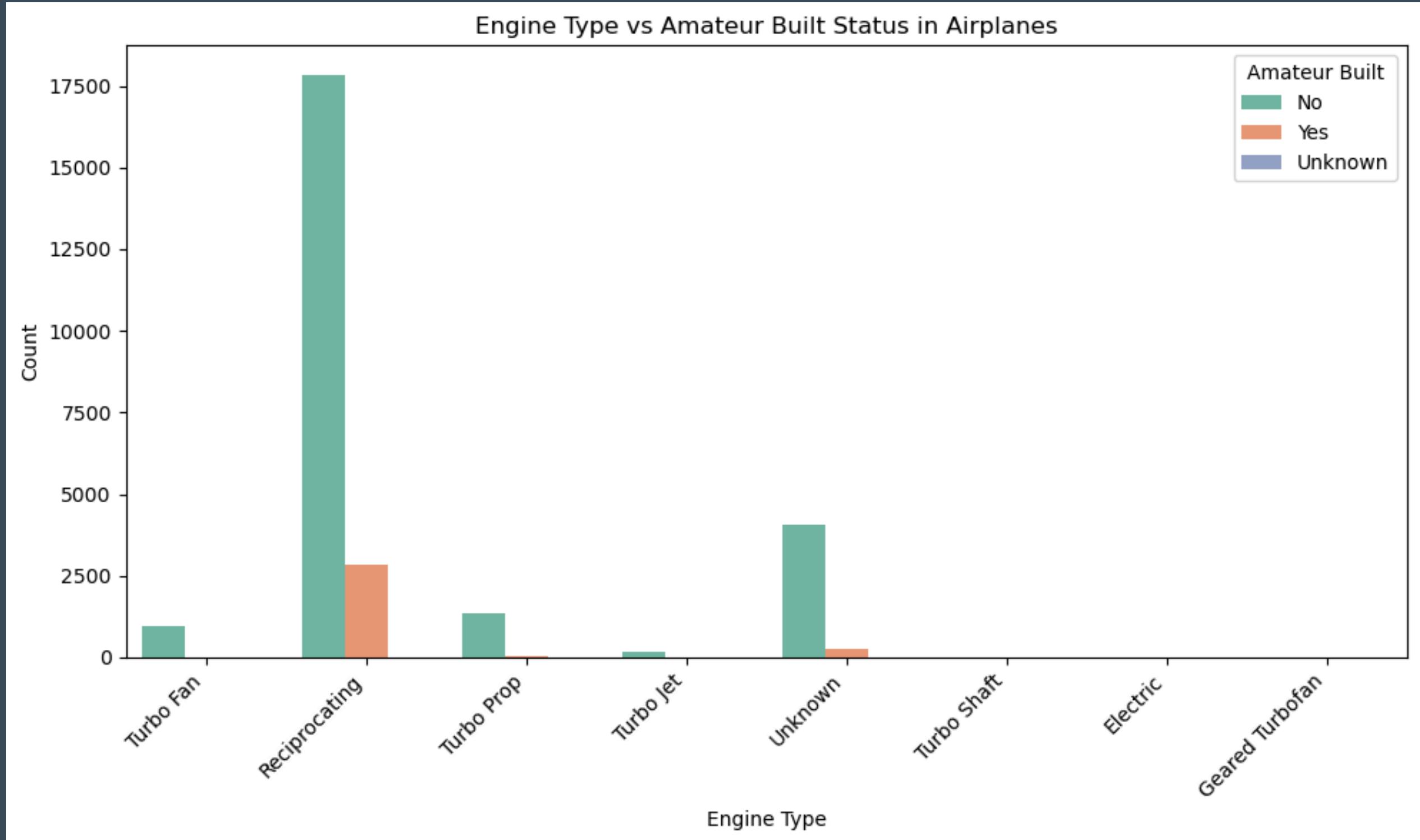
DATA ANALYSIS

Question 1:

What are the specifications for the aircraft, and how can we filter airplanes in the dataset?



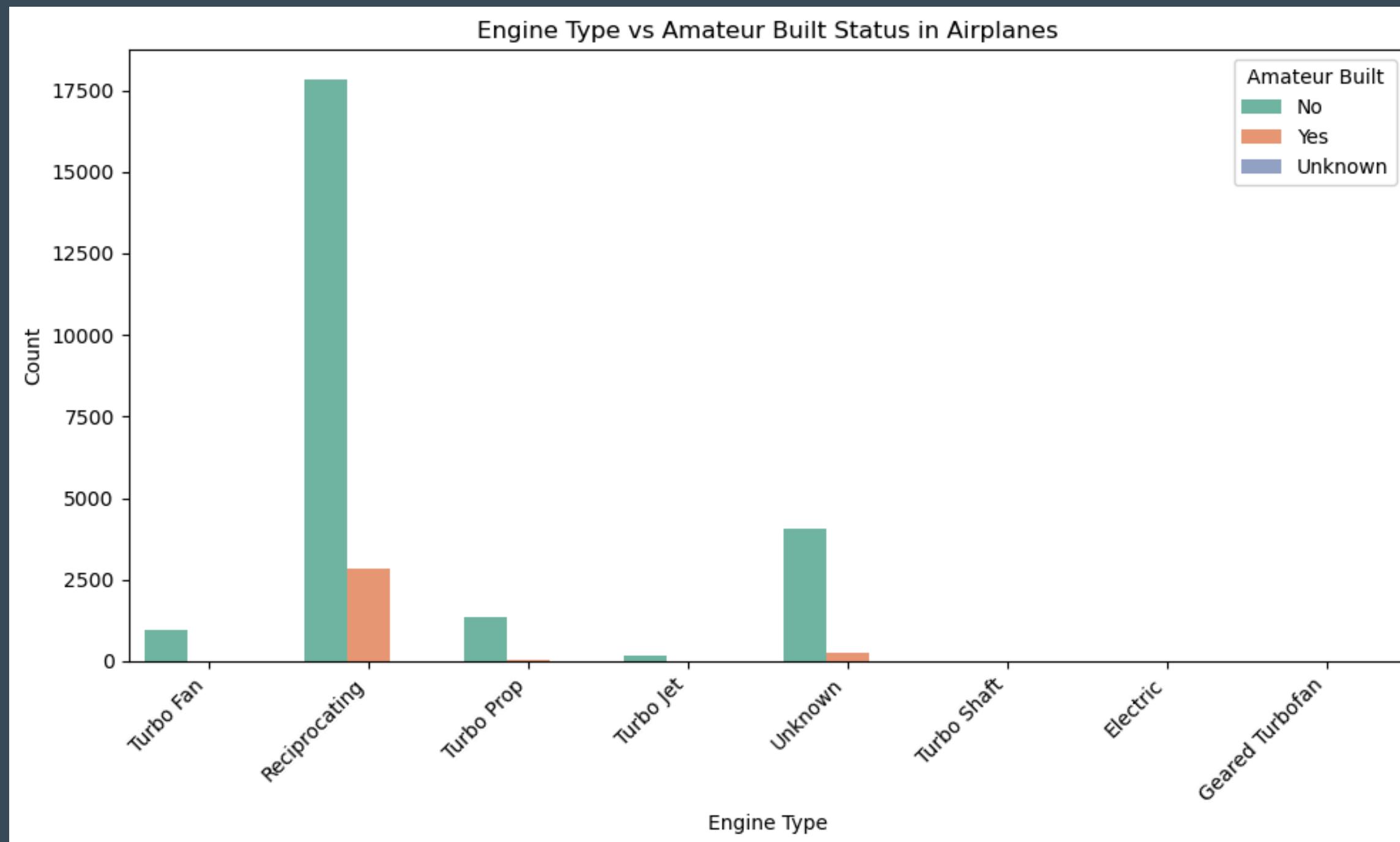
1.



- Most Airplanes have 1 engine.
- Reciprocating engine types are the most common among airplanes.



2.



- Most Airplanes are not Amateur Built



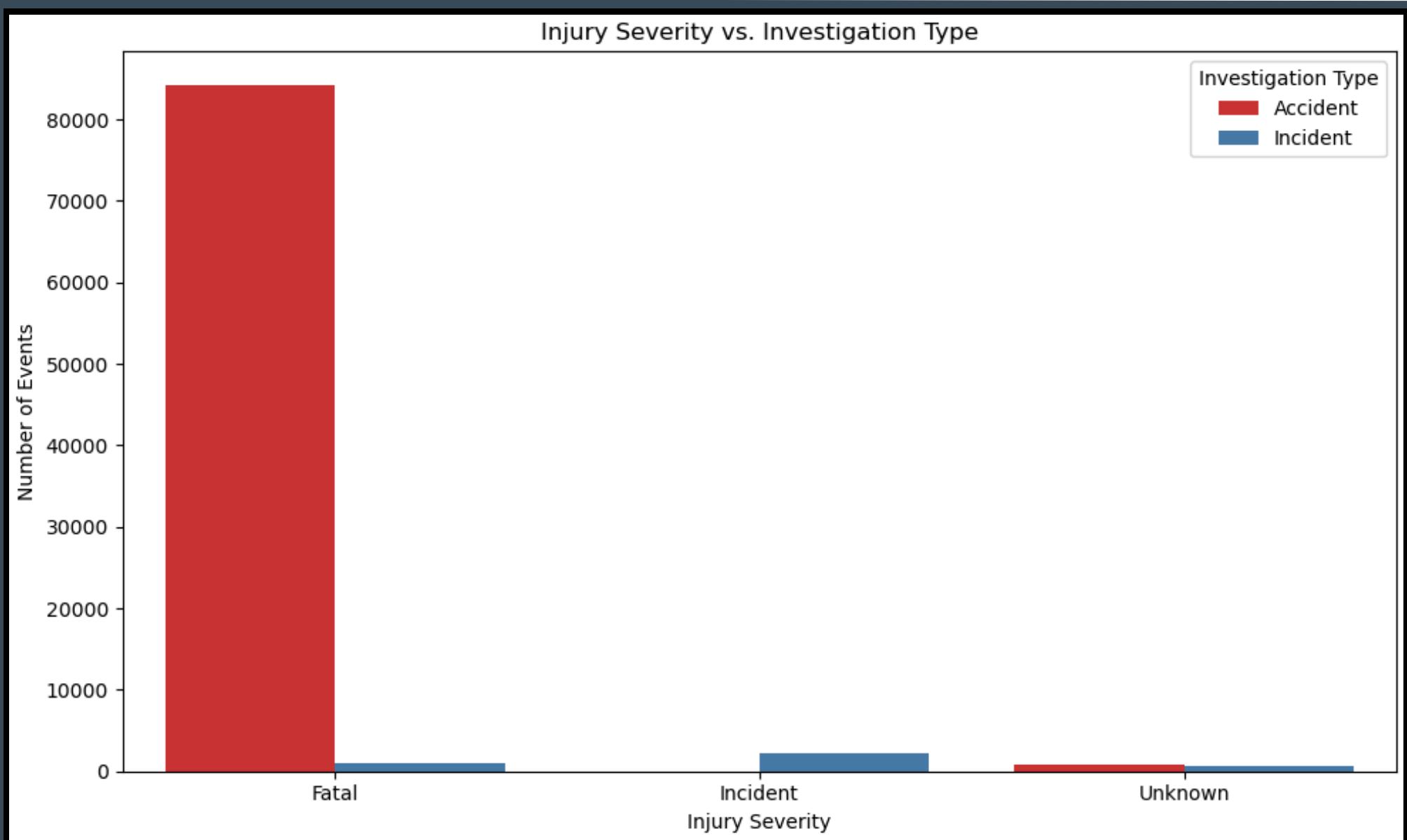
Question 2:

How many accidents or incidents has each airplane been involved in
and Top 10 safest airplane?



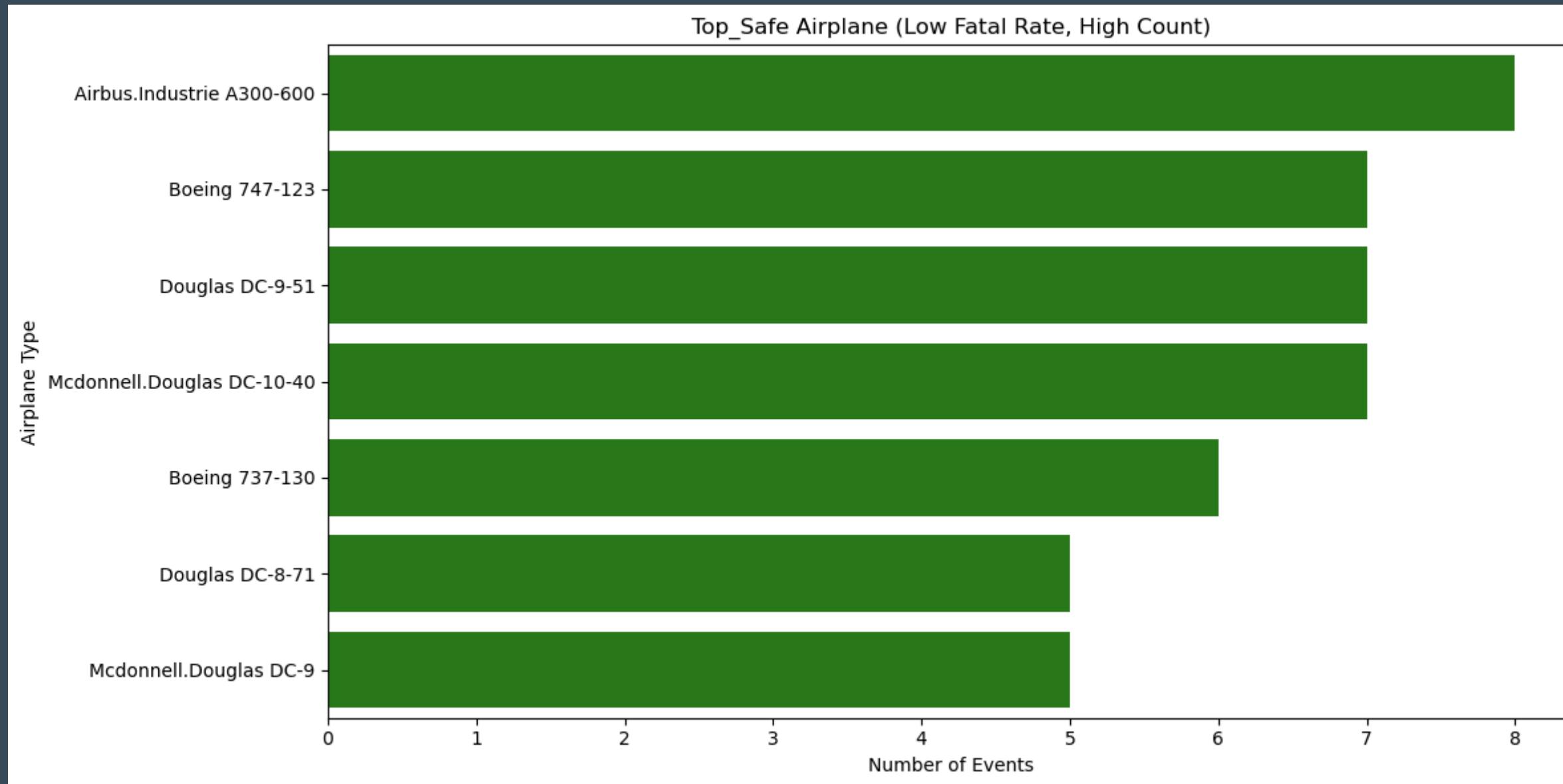


1.



- Accidents were the highest causes of fatalities compared to incidents.

2.

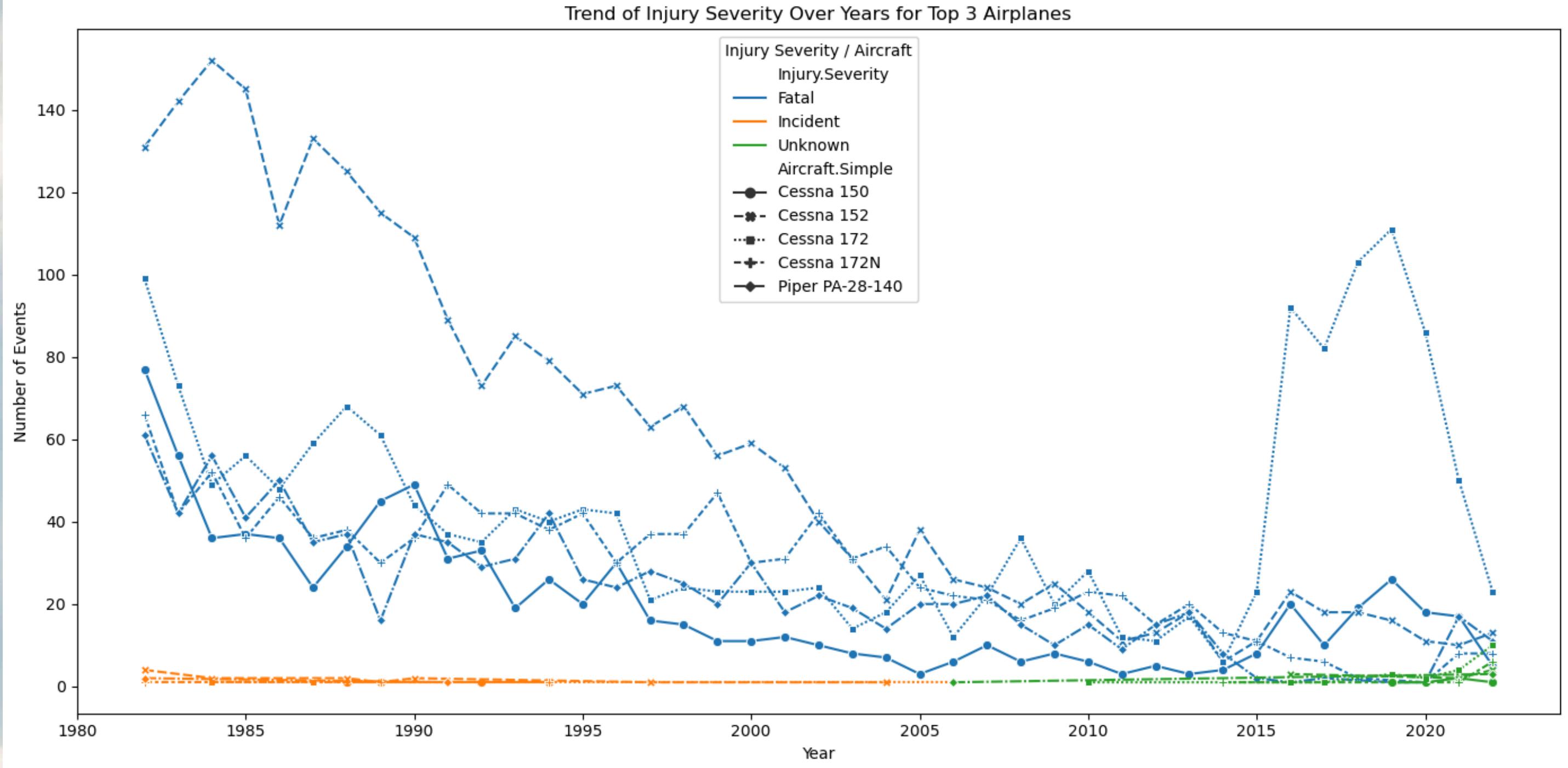


- Airbus.Industrie A300, Boeing 747-123, Douglas DC-9-51, McDonnell.Douglas DC-10-40, Boeing 737-130 are top 5 most safe airplanes with low fatalities but high counts.



3.

Trend of Injury Severity Over Years for Top 3 Airplanes



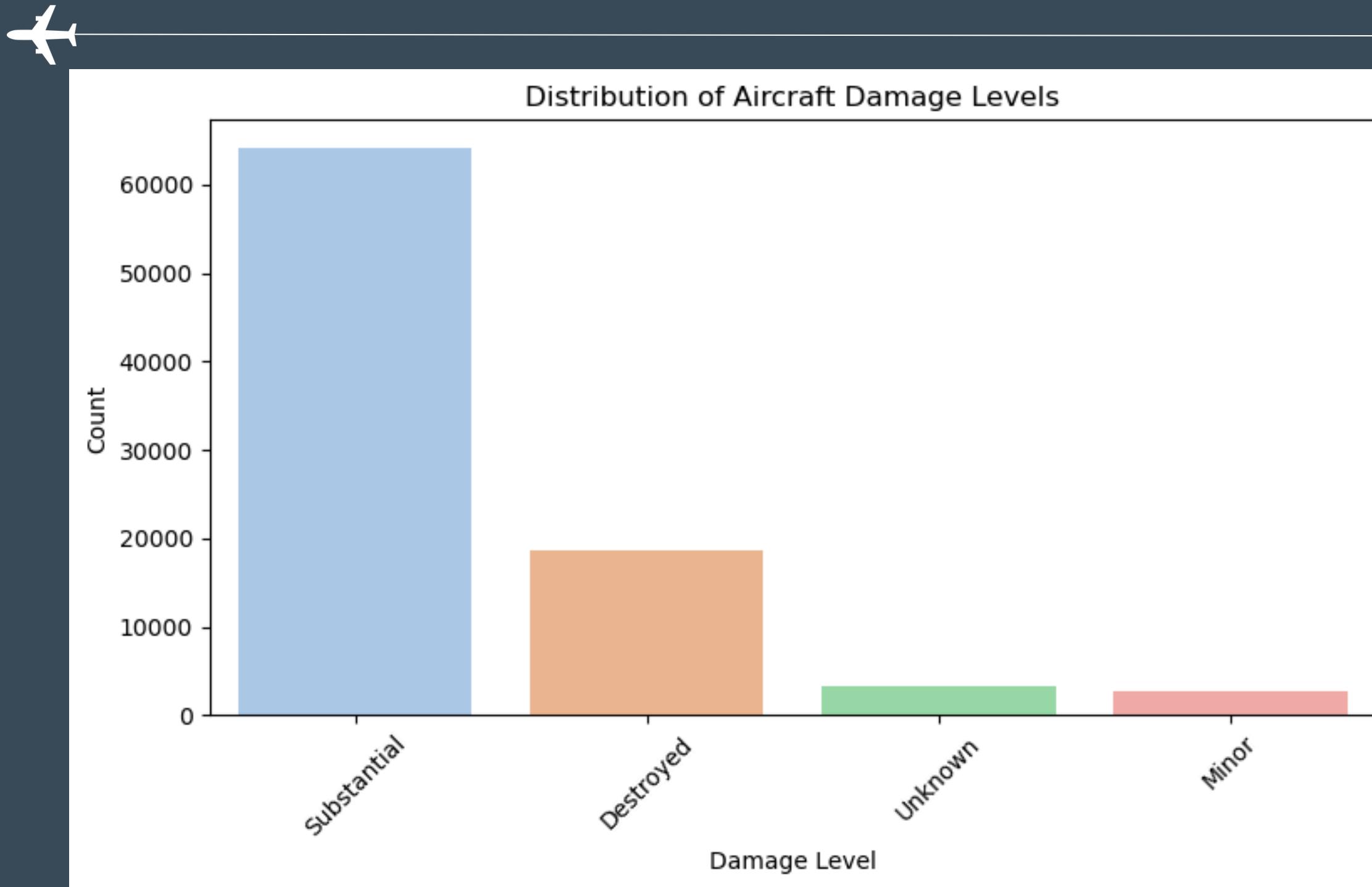
- Cessna models have had high counts of fatal accidents over time.

Question 3:

How many accidents or incidents has each airplane been involved in and
Top 10 safest airplane?



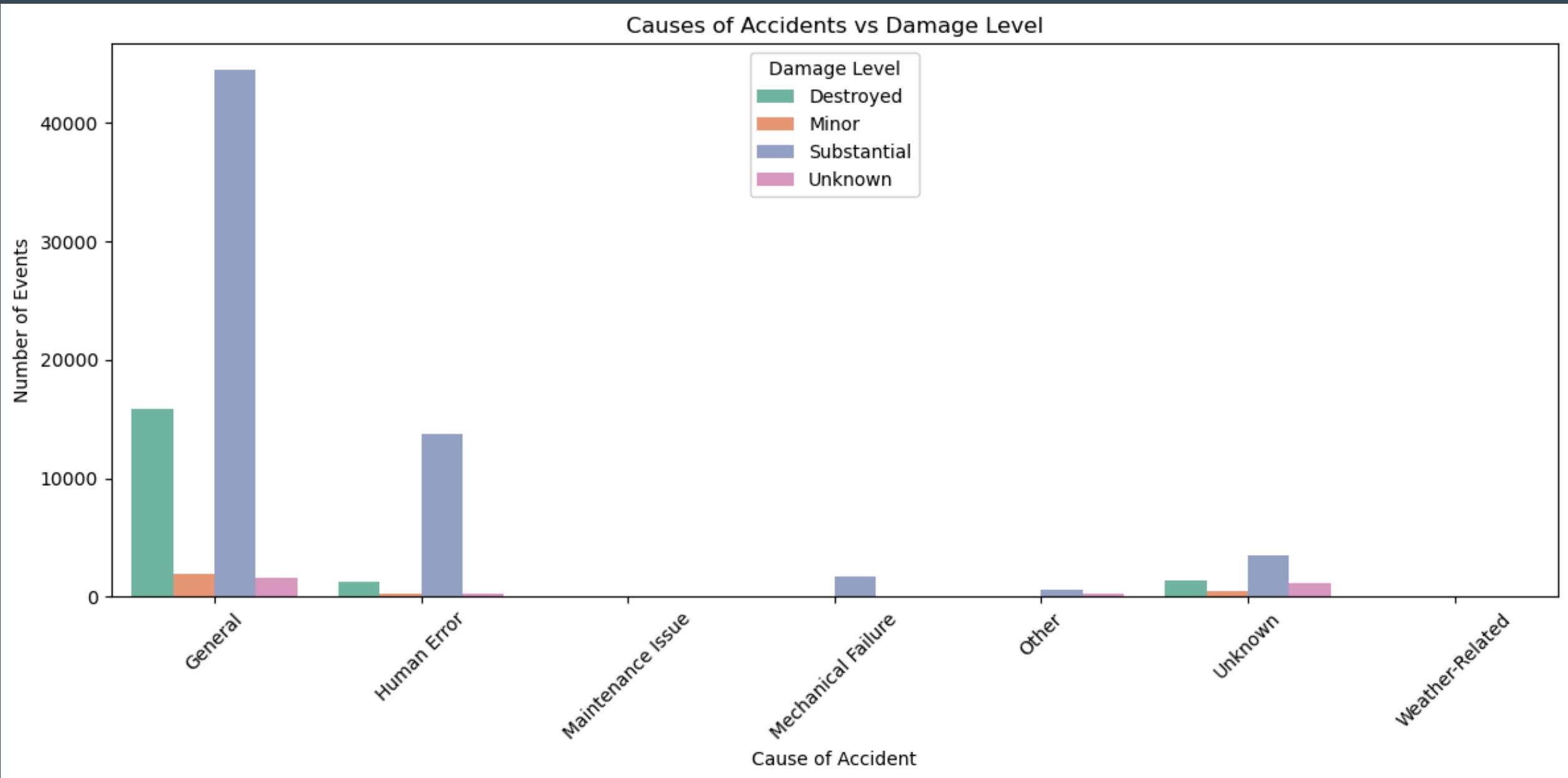
1.



- Most airplanes were substantially damaged in the events.



2.



- Major causes of accidents and incidents are general, human error and mechanical failure.

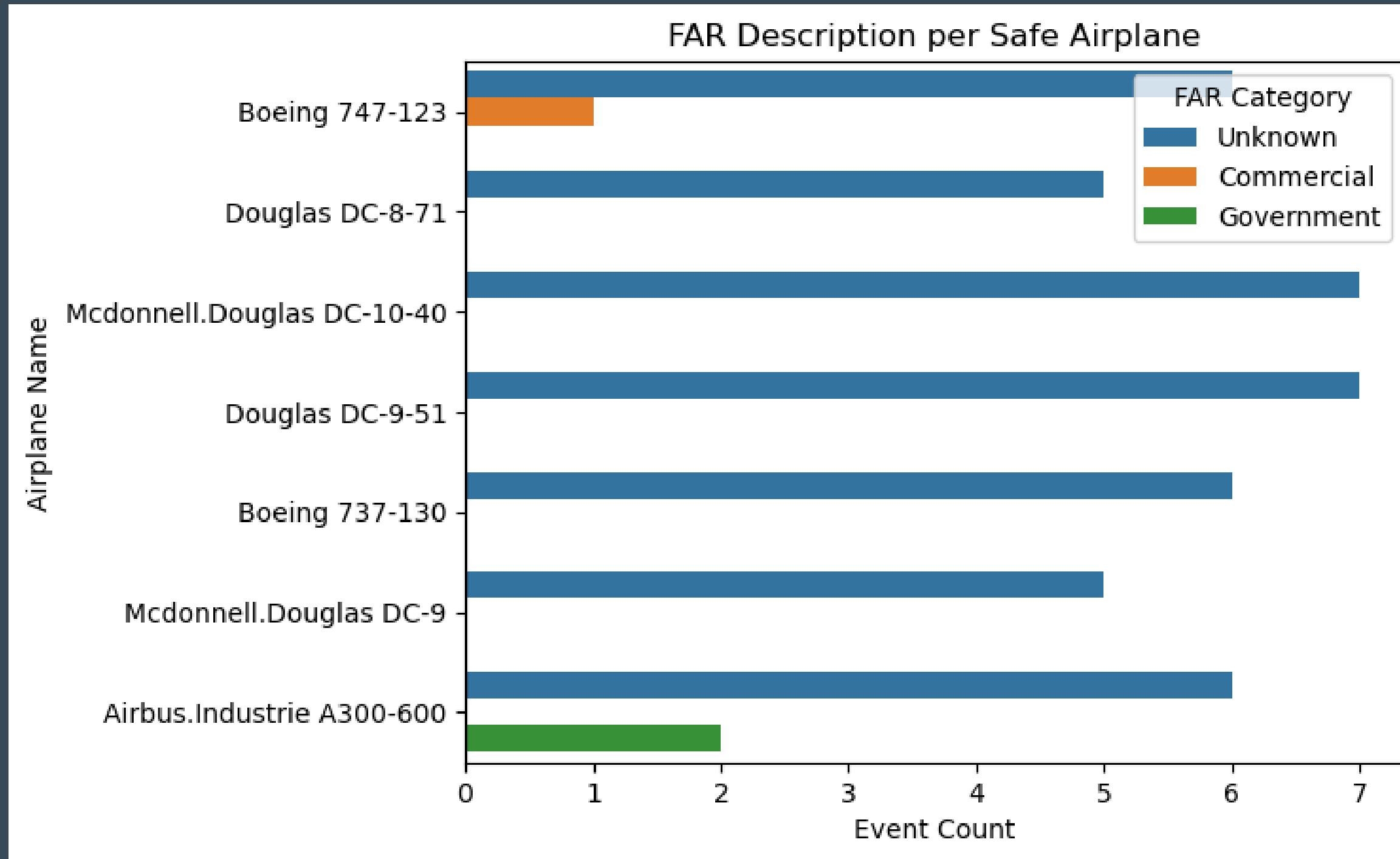


Question 4:

Are the said safest airplanes useful for commercial and private operations?



1.



- Boeing 747-123 clearly determined by the analysis is used for both commercial and personal operations
- The data on airplanes purpose were missing, hence the outcome of unknown use high counts.



Final Recommendations

- Based on the dataset provided and the criteria of low injury severity and minimal damage, the Boeing 747-123 emerges as the most suitable aircraft for the new aviation division. It is not only identified as safe, but is also positively confirmed to serve both commercial and private operations, making it the ideal candidate for acquisition.

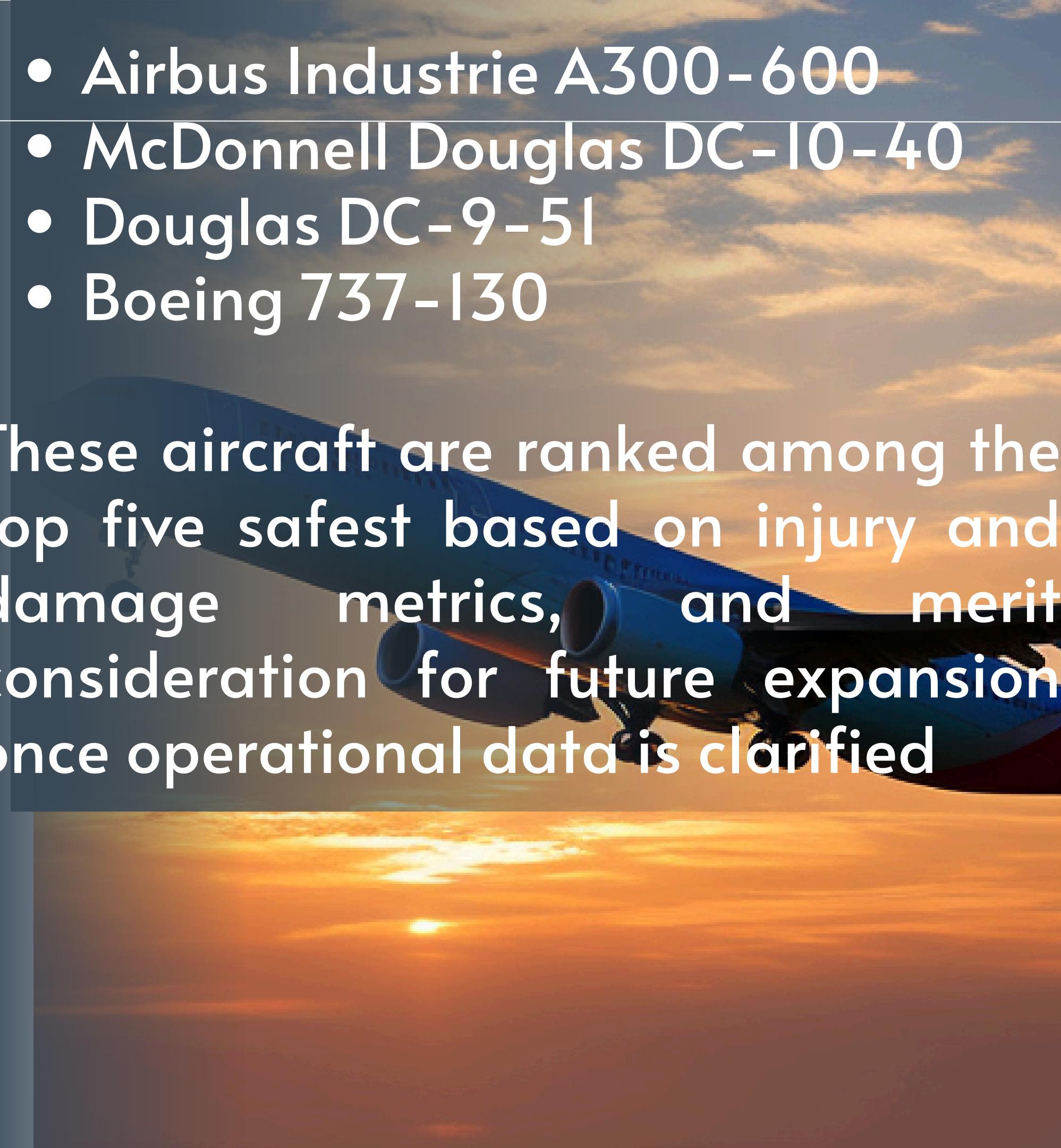


Note:

- There were significant data gaps in the Purpose of Flight column for many airplane types, with a high proportion of records marked as “Unknown.” This may limit full operational visibility for some aircraft.
- Nevertheless, based on their strong safety profiles, defined by high event counts, low fatality rates, and low levels of aircraft damage, the following airplanes are also recommended (despite their purpose being mostly unknown):



- Airbus Industrie A300-600
- McDonnell Douglas DC-10-40
- Douglas DC-9-51
- Boeing 737-130



These aircraft are ranked among the top five safest based on injury and damage metrics, and merit consideration for future expansion once operational data is clarified

THANKS!

DO YOU HAVE ANY QUESTIONS?

