PHASE ONE
PROJECT PRESENTATION

Billy Sambasi

The Business Questions

1. How have the number of aviation accidents changed over the years?

2. Which aircraft models are involved in the most incidents and are certain engine types associated with higher incident rates?

3. Are certain weather conditions more likely to result in severe injuries or fatalities?

4. What are the most common types of aircraft damage in accidents?

Objectives

- Analyze accident trends over time
- Identify aircraft models with the most incidents (engine types)
- Investigate the impact of weather conditions
- Analyze aircraft damage

Project Steps

- Loading and Understanding the data
- Cleaning and Normalizing the data
- Data Visualization and Analysis

Loading and Understanding the Data

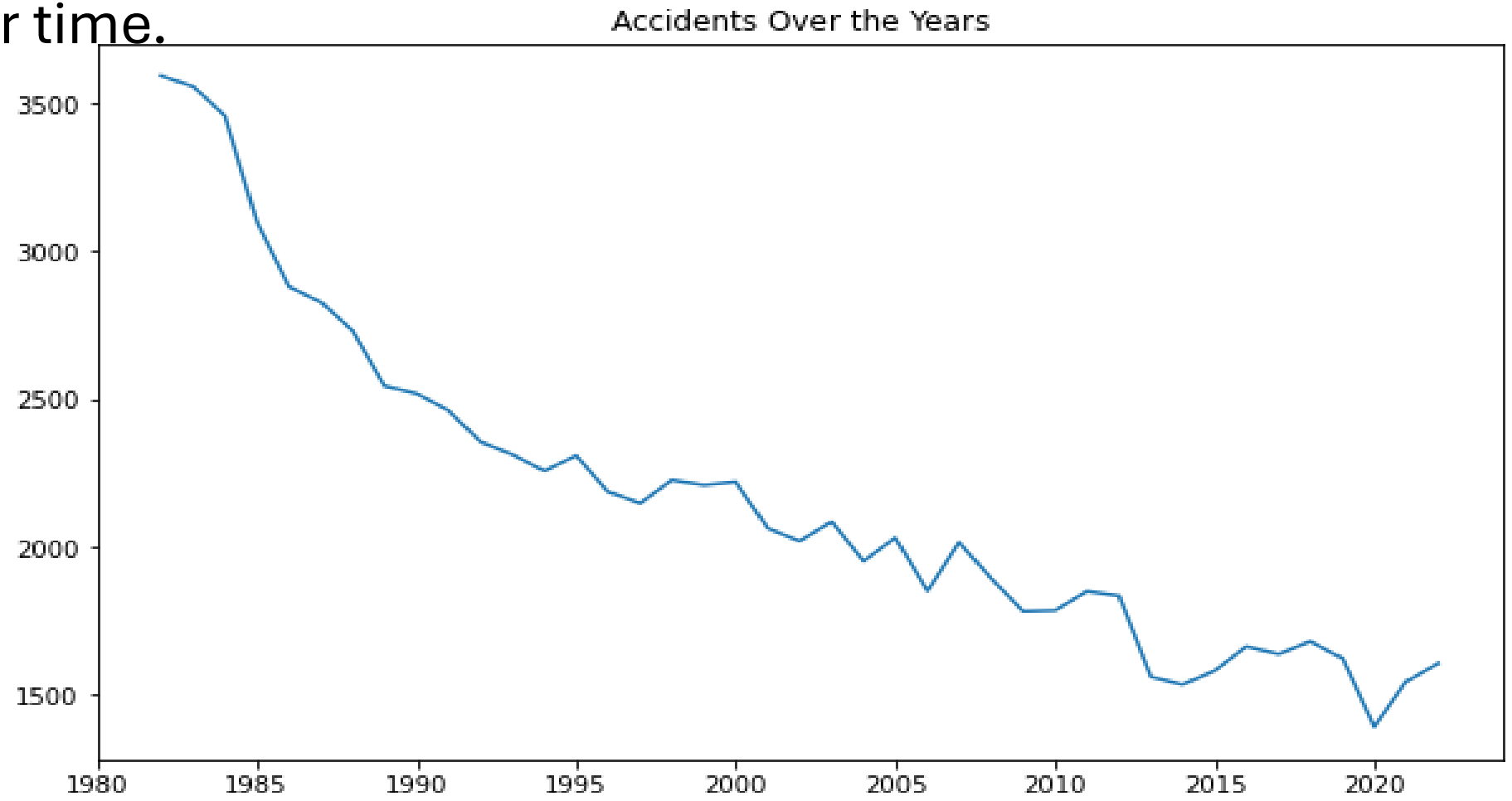
- Importing the Data with the necessary libraries, recognising the rows and columns of the dataset, inspecting for duplicates and identifying missing values.
- The dataset had 31 columns and 88889 rows. The data types of the dataset included objects (categorical values) and floats (numerical values). Out of the 31 columns, 4 had no missing values.

Cleaning and Normalizing the Data

- Dropping of unnecessary columns for driven analysis.
- Replacing and filling missing values.
- Changing column data types to proper and easily manageable data types.
- Adding necessary columns for derived features.
- Checking for outliers in the numerical column.

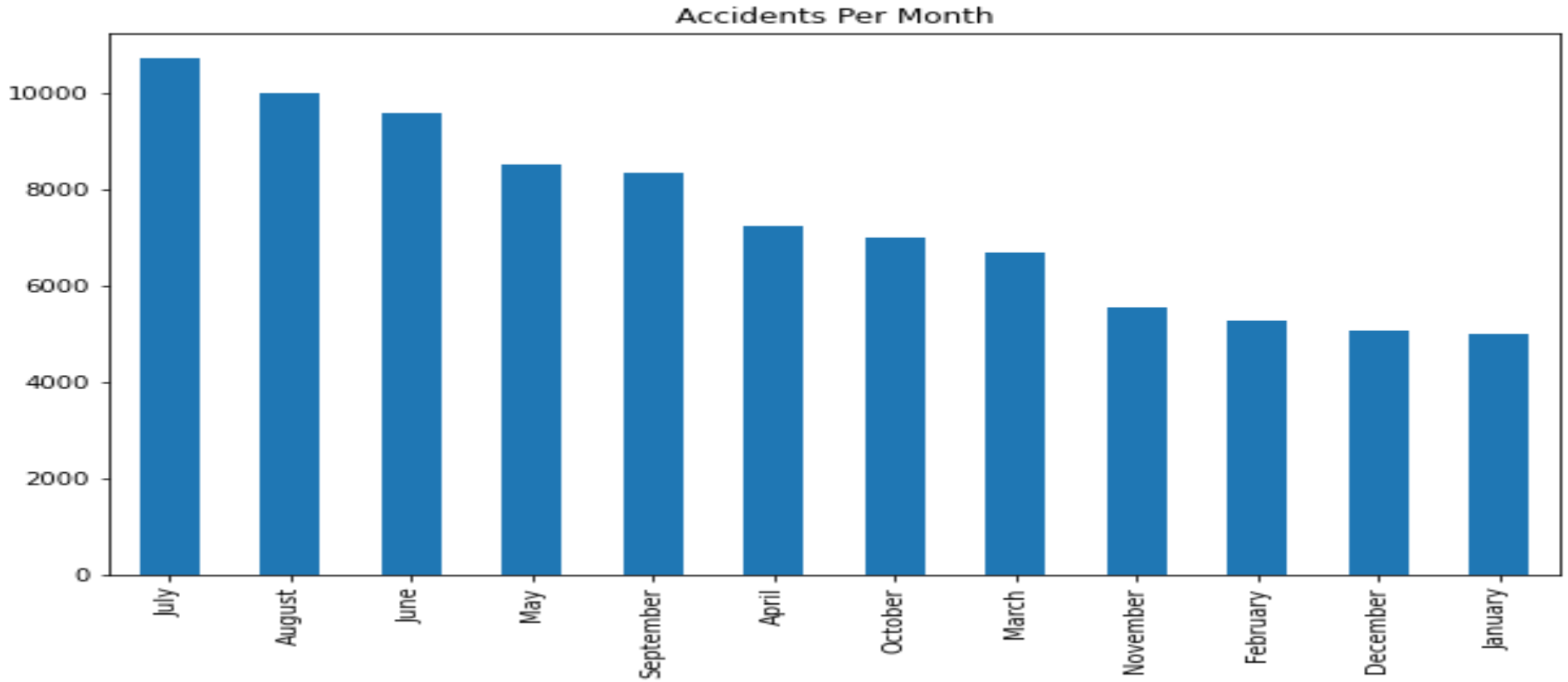
Data Visualization and Analysis

Objective 1: Analyze accident trends to understand aviation risks over time.



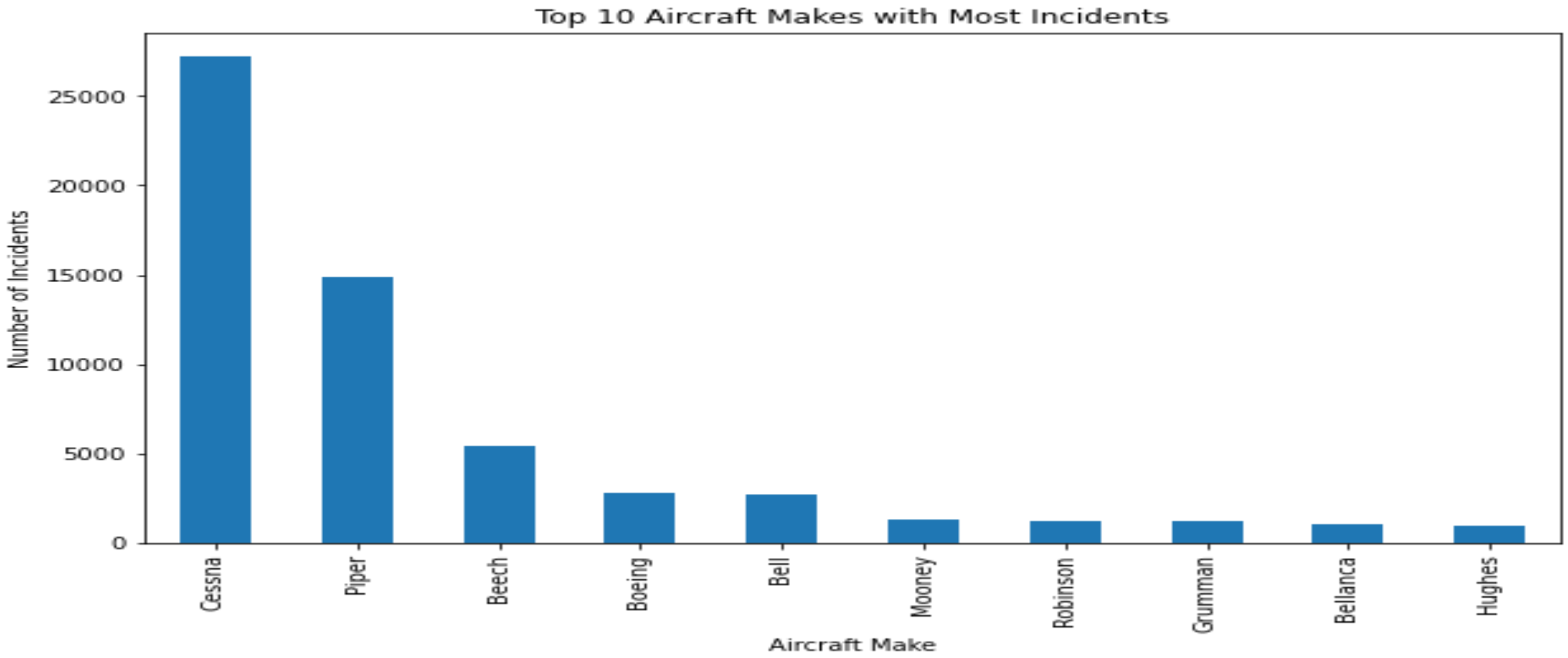
Over the years, there was a downward trend in the number of accidents.

- Objective 1: Analyze accident trends over time



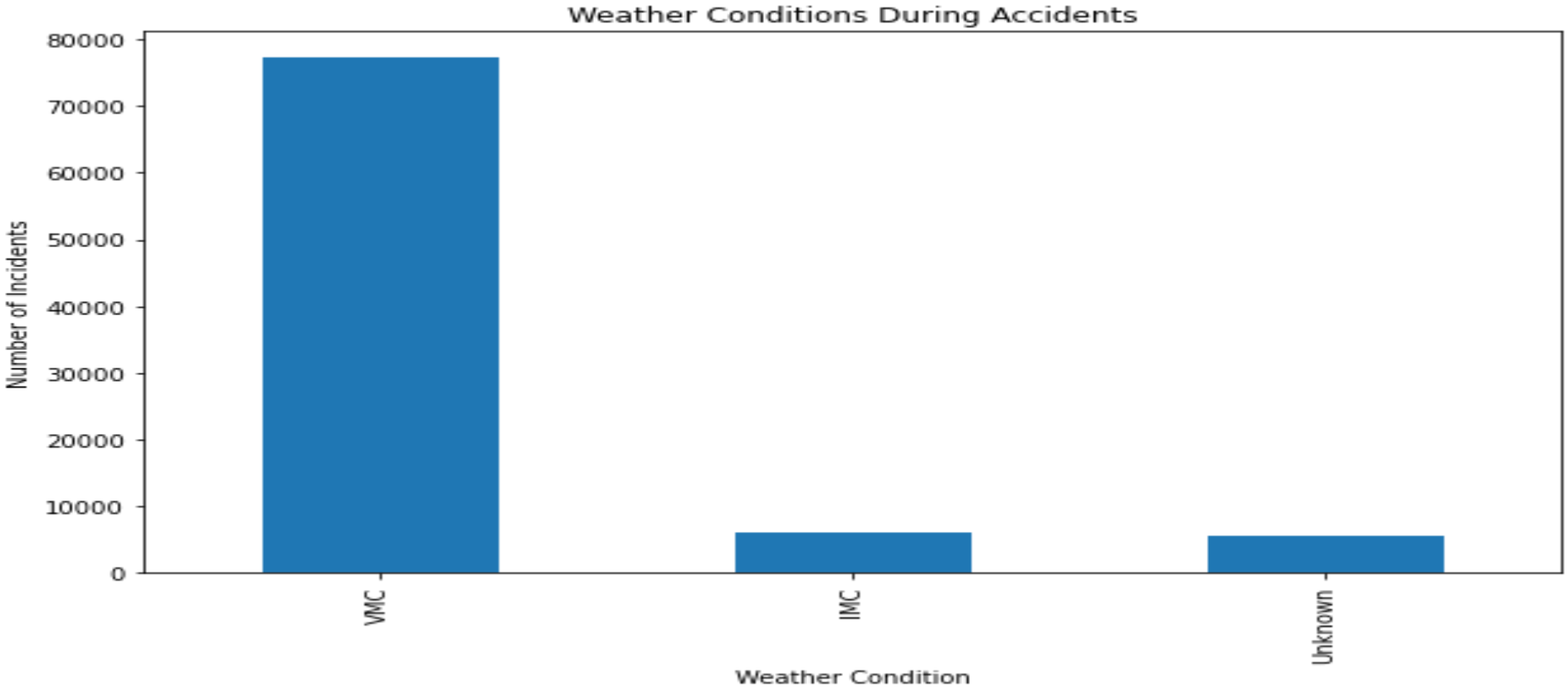
- Accident trends seemed to peak in the months of June, July and August.

Objective 2: Determine the safest aircraft models and engine types



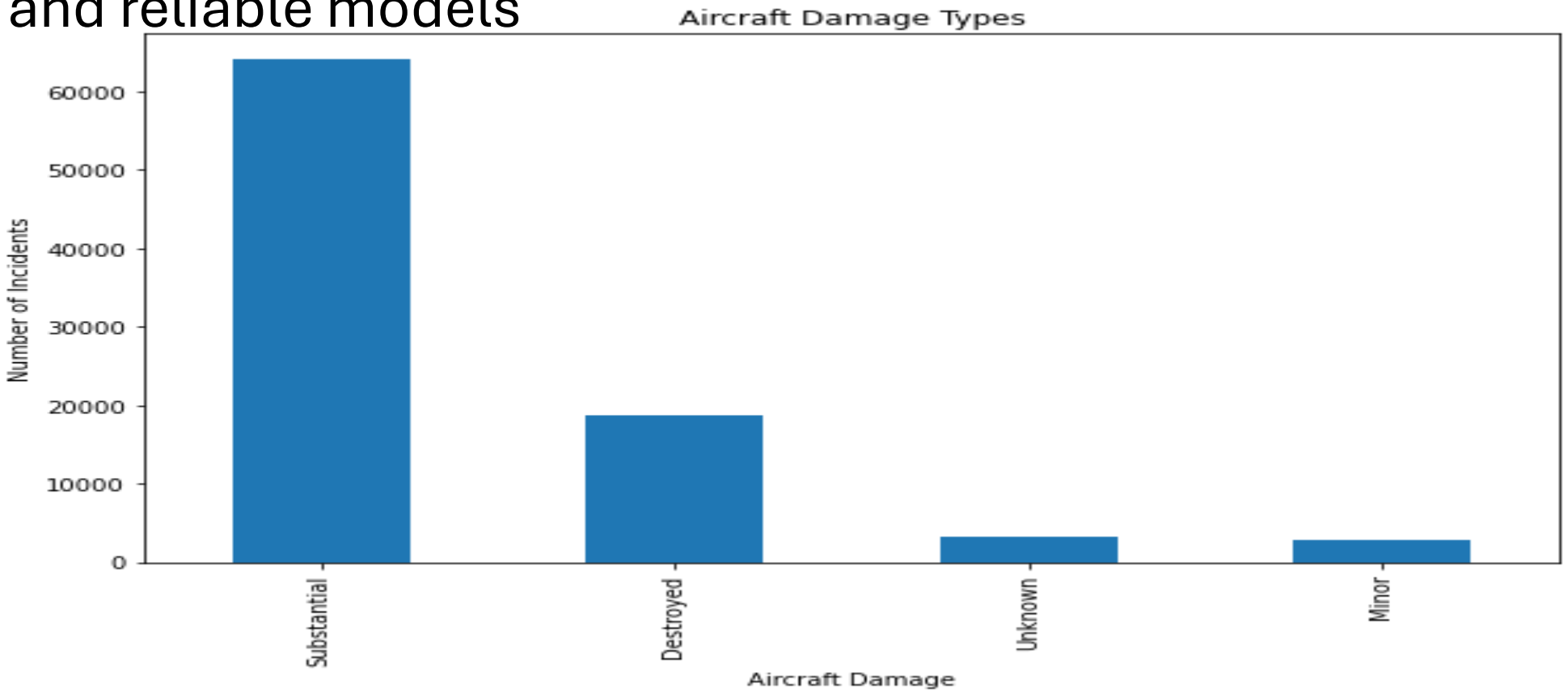
The aircraft make, Cessna, had the most incidents compared to the rest.

Objective 3: Evaluate the impact of weather conditions on aircraft safety



The weather condition, VMC(Visual Meteorological Condition) has the most incident than the IMC (Instrument Meteorological Condition).

Objective 4: Assess aircraft damage patterns to identify durable and reliable models



The damage sustained to most of the aircraft across the makes was substantial.

Findings

- There was a decline in the number of accidents over the years which may be due to improvements in the aviation safety measures and procedures or advancements in technology
- Months with fewer accidents may indicate periods of reduced air traffic or favorable weather conditions.
- Models with fewer incidents may indicate better safety records or less frequent use.
- Engine types with fewer incidents may indicate better reliability or suitability for certain conditions.
- Higher accident rates under adverse weather conditions may highlight the need for better weather forecasting, pilot training or equipment upgrades.
- Less severe damage e.g. 'Substantial' may suggest incidents where safety measures or emergency responses were effective in minimizing harm.

Recommendations

- The business should focus on low-risk aircraft models with the lowest incident rates and have a history of reliability reducing operational risks and build trust with clients by prioritizing safer aircraft models.
- The business should consider focusing on engine types with low incident rates and can be reliable and should implement predictive maintenance systems to monitor engine performance and prevent failures. These would minimize downtime and maintenance costs while ensuring operational safety and reliability.
- The business should choose aircraft equipped with advanced weather detection systems and avionics to handle adverse weather conditions effectively. This would reduce weather-related risks and ensure safer operations in diverse environmental conditions.
- The business should consider investing in aircraft with advanced safety features e.g. fire suppression systems and effective evacuation mechanisms. This would improve passenger safety and reduce the likelihood of catastrophic losses in the event of an incident.

Conclusions

- The business should consider prioritizing low-risk aircraft models as they are the safest options for the business to invest in.
- The business should emphasize reliable engine types as they are critical for ensuring operational safety and minimizing maintenance costs.
- The business should consider investing in weather-resilient aircraft and training pilots to handle challenging conditions to reduce weather-related risks and ensure safer operations.
- The business should consider investing in advanced safety features like fire suppression systems and effective evacuation mechanisms better equipped to handle emergencies.