

LOW-RISK AIRCRAFT ANALYSIS

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OVERVIEW

GOAL:

Identify low-risk aircraft for both private and commercial purposes

OBJECTIVE:

Analyze aviation accident data to assess risks associated with various aircraft types.

Business Understanding

Business Problem:

- As the company seeks to diversify into the aviation industry, the critical challenge of understanding the risks associated with different aircrafts is needed.
- The primary objective is to identify which aircraft present the lowest risk for both commercial and private operations.
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- By analyzing data on aircraft accidents and injuries that aim to uncover trends that highlight safer options.

Key Business Questions:

- What types of incidents have been most prevalent in the aviation sector?
- Which aircraft makes have the fewest accidents and injuries?
- How do weather conditions and flight phases correlate with injury severity?

DATA UNDERSTANDING

- In this dataset under the file path AviationData.csv there is a CSV file containing information about the NTSB aviation accident database contains information from 1962 and later about civil aviation accidents and selected incidents within the United States, its territories and possessions, and in international waters.

The key features of analysis will be:

- Key aircraft details - such as the make and the model of the aircraft
- Total.Fatal.Injuries, Total.Serious.Injuries, Total.Minor.Injuries, Total.Uninjured. These metrics are important for evaluating the safety of different aircraft.
- Weather Condition: Analyze impact of weather on accidents.
- Broad.phase.of.flight: To get an understanding where accidents occur(is it during landing,takeoff or cruising).
- Event.Date: For analyzing trends over time.

DATA ANALYSIS

Methodology

1. Data Collection

- **Sourcing Data:** We collected a dataset from the NTSB aviation accident database.

2. Data Cleaning and Preparation

- **Standardization:** Standardized the dataset to ensure consistency across various fields (e.g., converting date formats and categorizing injury severity).
- **Handling Missing Values:** We employed techniques such as imputation for missing data and removal of duplicate entries to maintain data integrity.

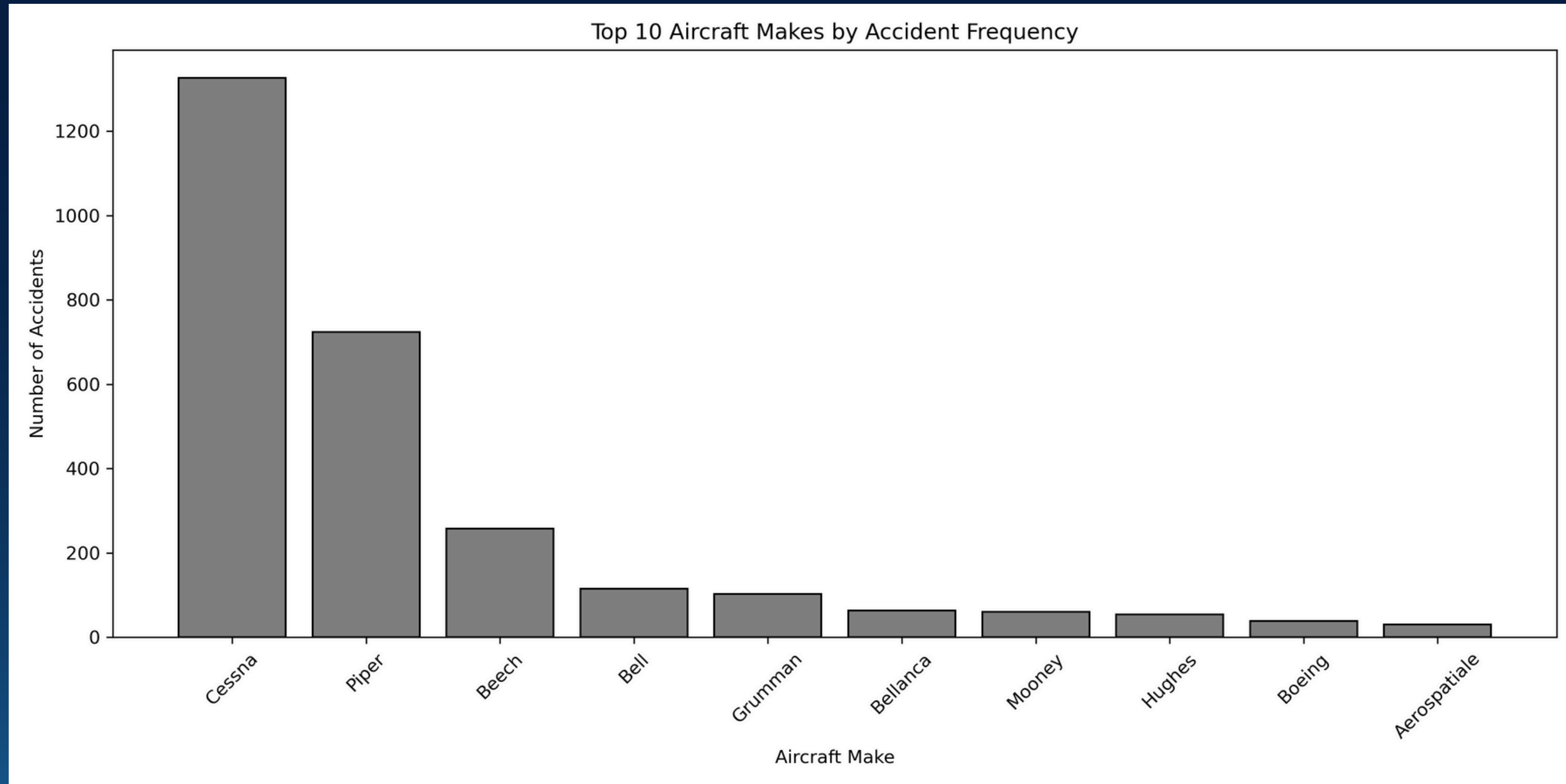
Methodology

3. Exploratory Data Analysis (EDA)- Using pandas library data analysis was performed.

4. **Descriptive Statistics:** Utilized summary statistics to understand distributions of key variables, identifying trends and patterns in aircraft operations.

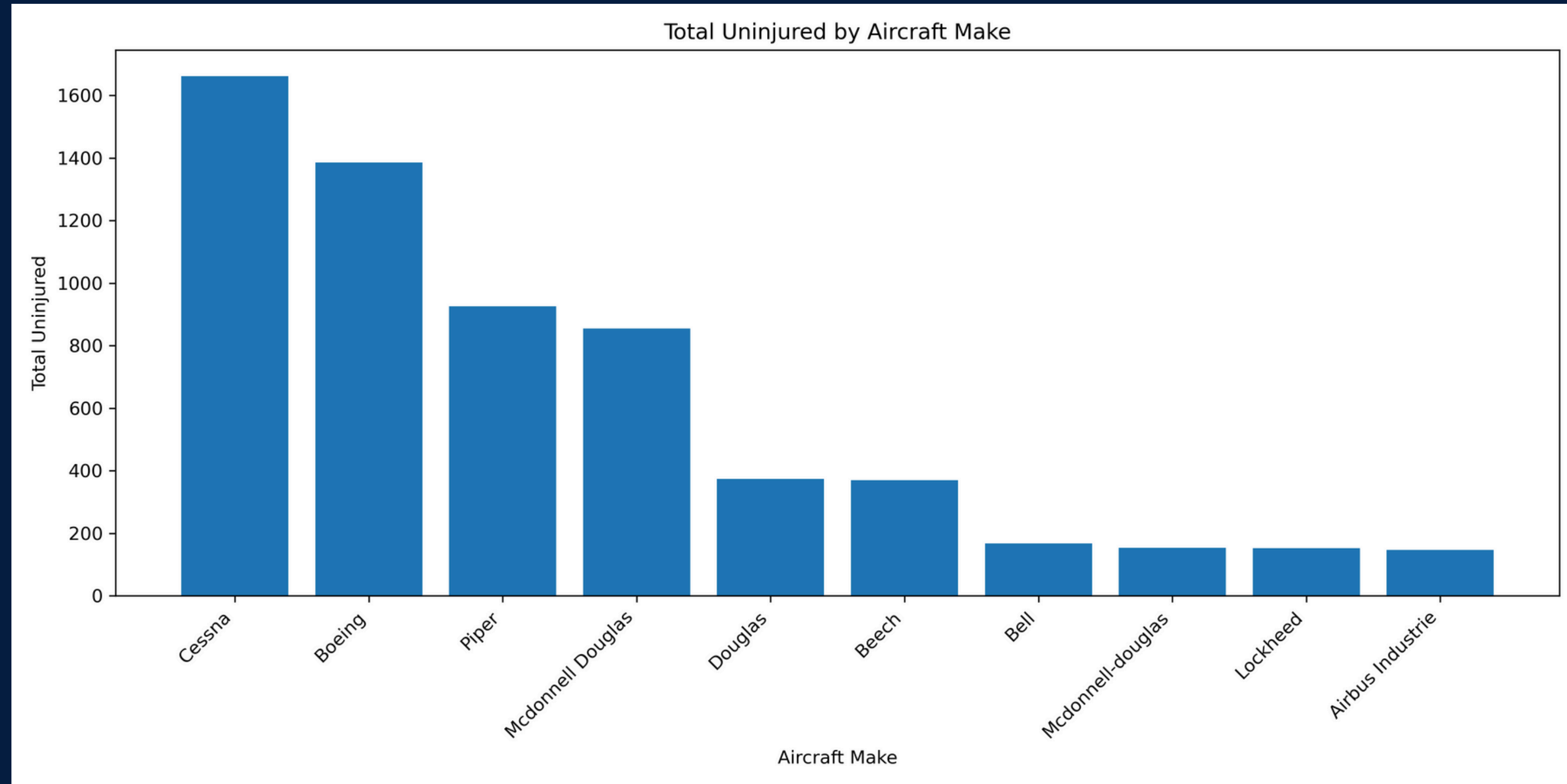
VISUALIZATION

Injury Severity by Aircraft Make

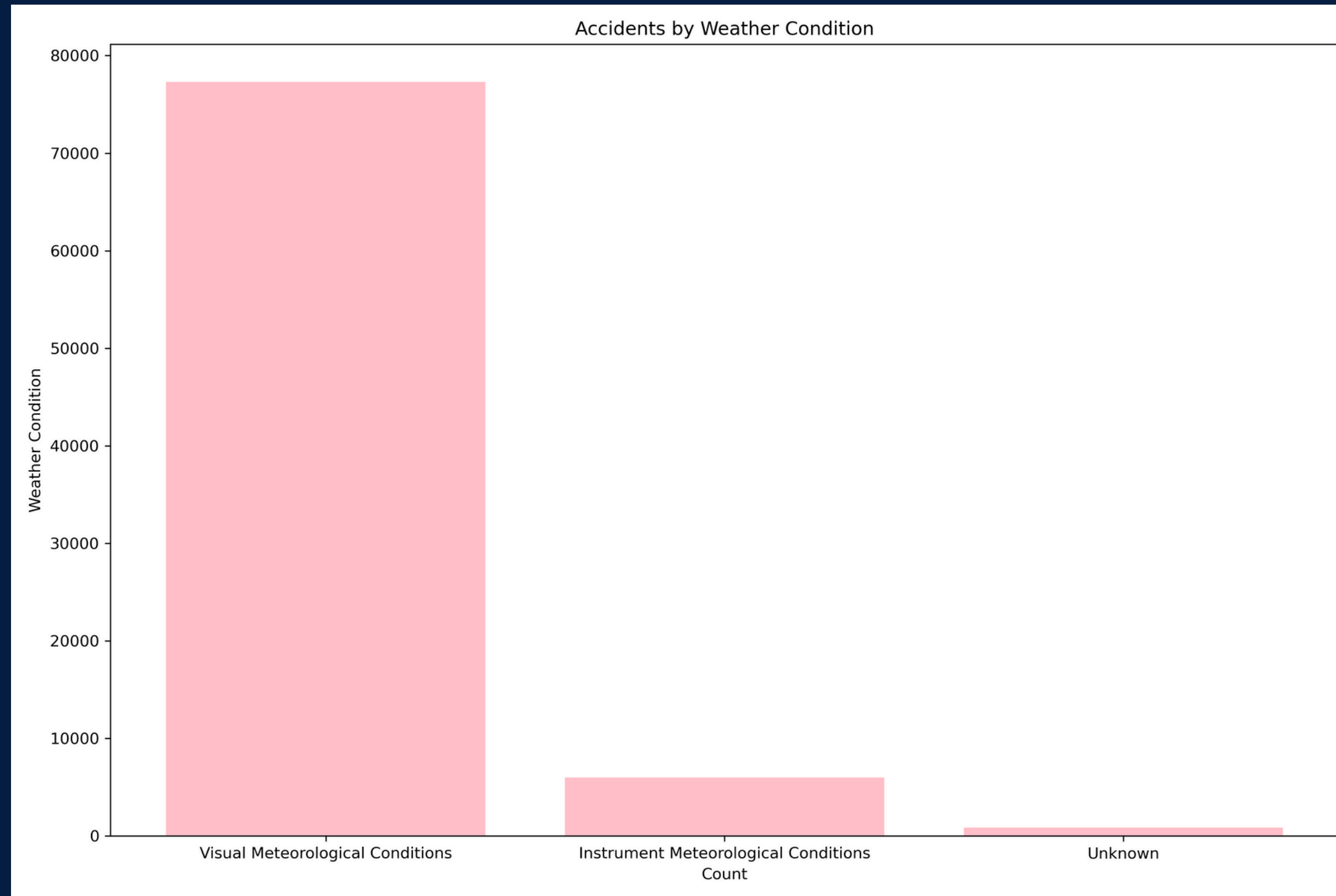


- **Insight:** The chart allows for a direct comparison among the top models, making it easier to gauge which aircraft are safer choices for the operation.

VISUAL 2 : TOTAL UNINJURED BY AIRCRAFT MAKE

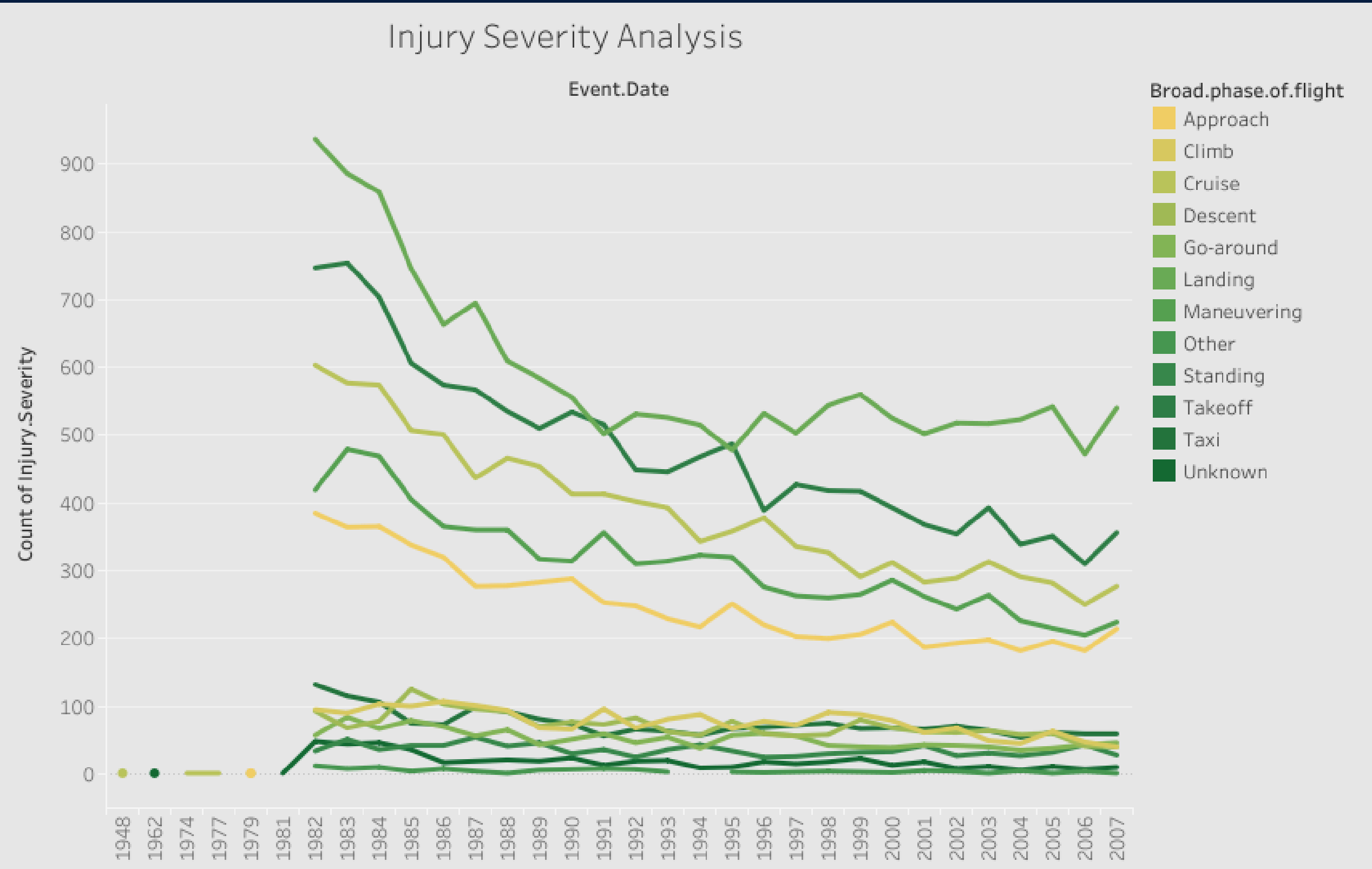


Insight: Although Cessna is seen as the aircraft make that has many total injury severity it is still the one with the highest total uninjured compared to other makes this confirms that Cessna being the aircraft make that is highly used.



VISUAL METEOROLOGICAL CONDITIONS IS THE HIGHEST SINCE IT PROVIDES IDEAL CONDITIONS FOR WHICH PILOTS HAVE SUFFICIENT VISIBILITY TO FLY

INJURY SEVERITY BASED ON THE PHASE OF FLIGHT



RECOMMENDATIONS


Based on the data analysis and visualizations carried out:

- **SELECT AIRCRAFT FOR DIVERSE WEATHER: IDENTIFY AIRCRAFT THAT HAVE DEMONSTRATED STRONG PERFORMANCE IN ADVERSE WEATHER CONDITIONS. MODELS WITH LOWER ACCIDENT RATES DURING THESE CONDITIONS SHOULD BE PRIORITIZED WHICH IS THE CESSNA AIRCRAFT MODEL WHICH IS THE MOST EFFICIENT ONE.**
- **OPERATIONAL GUIDELINES FOR WEATHER: DEVELOP SPECIFIC GUIDELINES FOR WHEN TO OPERATE CERTAIN AIRCRAFT IN VARYING WEATHER CONDITIONS. FOR INSTANCE, VMC(VISUAL METEOROLOGICAL CONDITIONS IS AN IDEAL WEATHER CONDITION WHICH PILOTS HAVE SUFFICIENT VISIBILITY TO FLY IN ORDER TO PRIORITIZE SAFETY MEASURES.**
- **TAKEOFF AND LANDING PERFORMANCE: FOCUS ON AIRCRAFT THAT EXHIBIT A HIGH SAFETY RECORD DURING TAKEOFF AND LANDING PHASES. THESE PHASES ARE CRITICAL AND OFTEN HAVE HIGHER ACCIDENT RATES. LANDING PHASE AS DEPICTED BY THE MULTIPLE LINE GRAPH SHOWS MOST ACCIDENTS OCCUR DURING THE LANDING PHASE.**
- **EMERGENCY PROCEDURES: ENSURE SELECTED AIRCRAFT HAVE WELL-DOCUMENTED EMERGENCY PROCEDURES AND PERFORMANCE DATA FOR CRITICAL PHASES, PARTICULARLY IN ADVERSE WEATHER SUCH INSTRUMENTAL METEOROLOGICAL CONDITIONS.**
- **EMPLOY HIGHLY TRAINED PERSONNEL THAT WILL BE ABLE TO OPERATE REGARDLESS OF THE WEATHER CHANGES.**

THANK YOU

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