RISK ANALYSISFOR DIVERSIFICATION IN THE AVIATION DIVISION

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Presented By;

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OVERVIEW

KOJ & Associates aims to enhance diversification in its Aviation Division by conducting a comprehensive risk analysis and evaluation.

The project involves identifying potential risks, assessing their impact, and developing mitigation strategies.

Findings will support sustainable expansion and strategic decision-making within the division.

PROBLEM STATEMENT

- The objective of this project is to facilitate KOJ And Associates entry into aviation division by identifying aircrafts with minimal risk for both commercial and private operations.

- Through analysis of aviation data from the year 1948-2022, this project's deliverables will be useful for recommendations on aircrafts' purchases having the lowest risk for the company to start the new business endeavor

OBJECTIVES

1. To identify and evaluate aircraft with the lowest risk based on historical accident data ensuring passenger safety and uninterrupted company operations. This analysis will support the new aviation division in establishing a reliable commercial and private enterprise.

2. To analyze accident trends and causes across various aircraft models, identifying risk patterns based on factors such as flight phase and aircraft type. This will help the company understand key contributors to aircraft accidents.

OBJECTIVES

3 To assess the safety performance of aircraft used in commercial and private operations and provide recommendations best suited for the enterprise's needs.

METHODOLOGY

- **Data cleaning**

This process corrects errors, resolves inconsistencies, and enhances accuracy, ensuring high-quality data for analysis.

- **Data analysis and visualization**

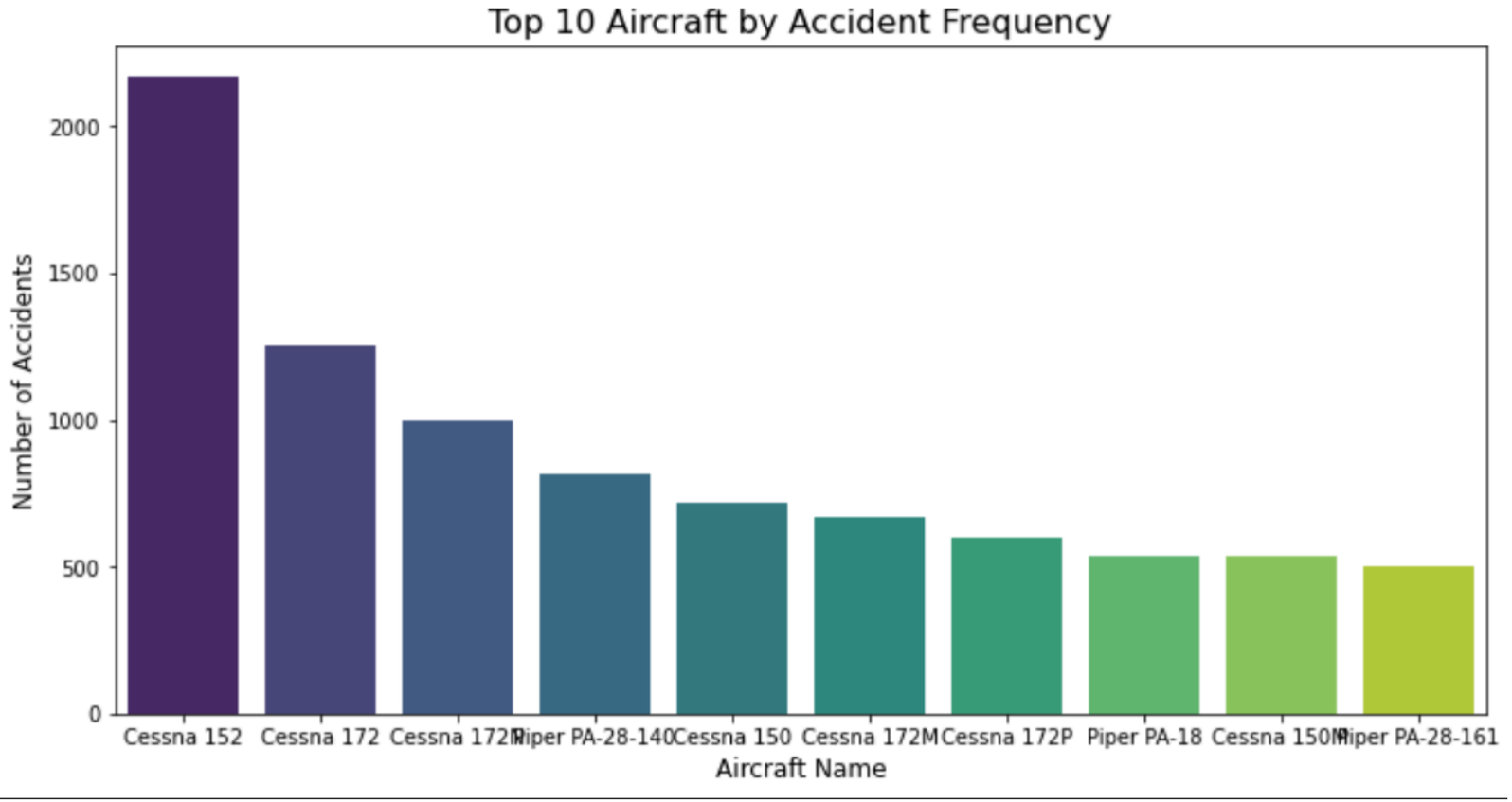
Performing Exploratory Data Analysis (EDA) to examine accident distributions and identify patterns.
Statistical methods are applied to assess correlations between aircraft make and model, weather conditions, accident frequency, injury severity, flight phase, and flight purpose.

- **Explanatory Data Analysis(EDA)**

Analyze, investigate, aggregate and summarize dataset's main characteristics.

DATA ANALYSIS

ANALYSING ACCIDENT FREQUENCY BY AIRCRAFT NAME

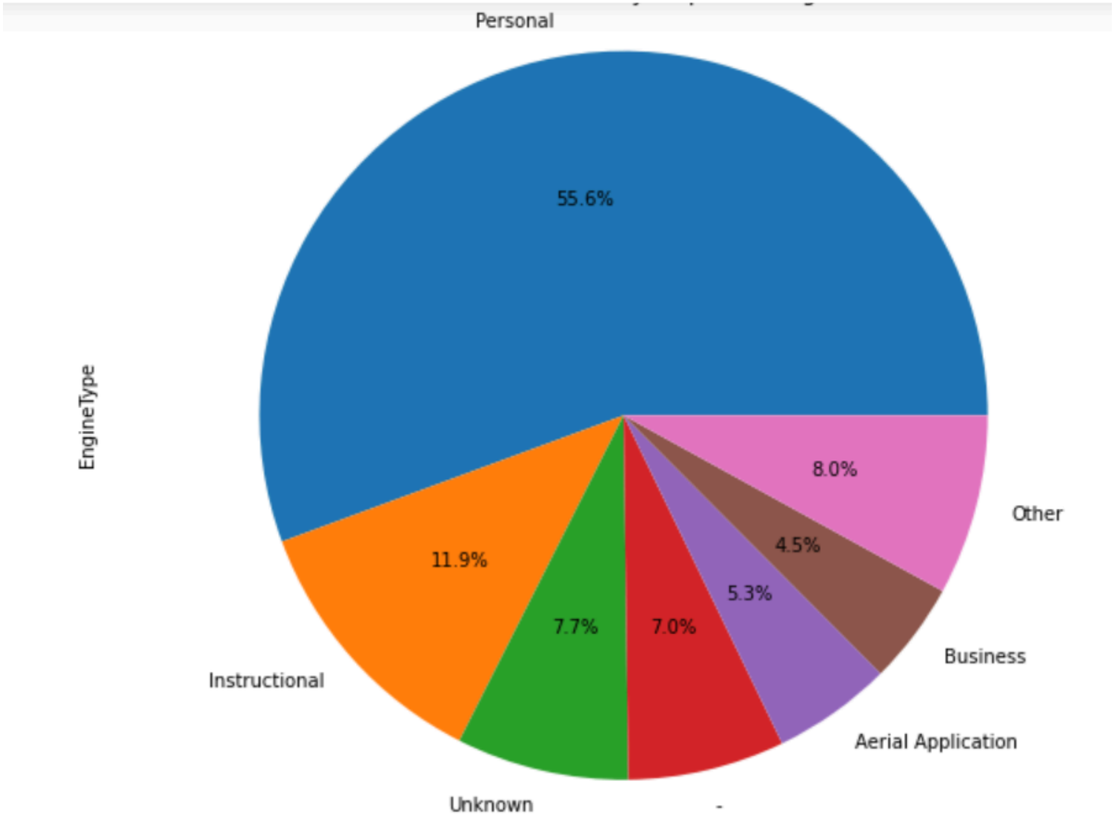


- The graph shows that Cessna 152 and 172 have higher accident rates compared to the 150M and Piper PA-28-161.

- This variation in accident rates highlights the impact of aircraft make and model in decision-making for aircraft purchases.

DATA ANALYSIS

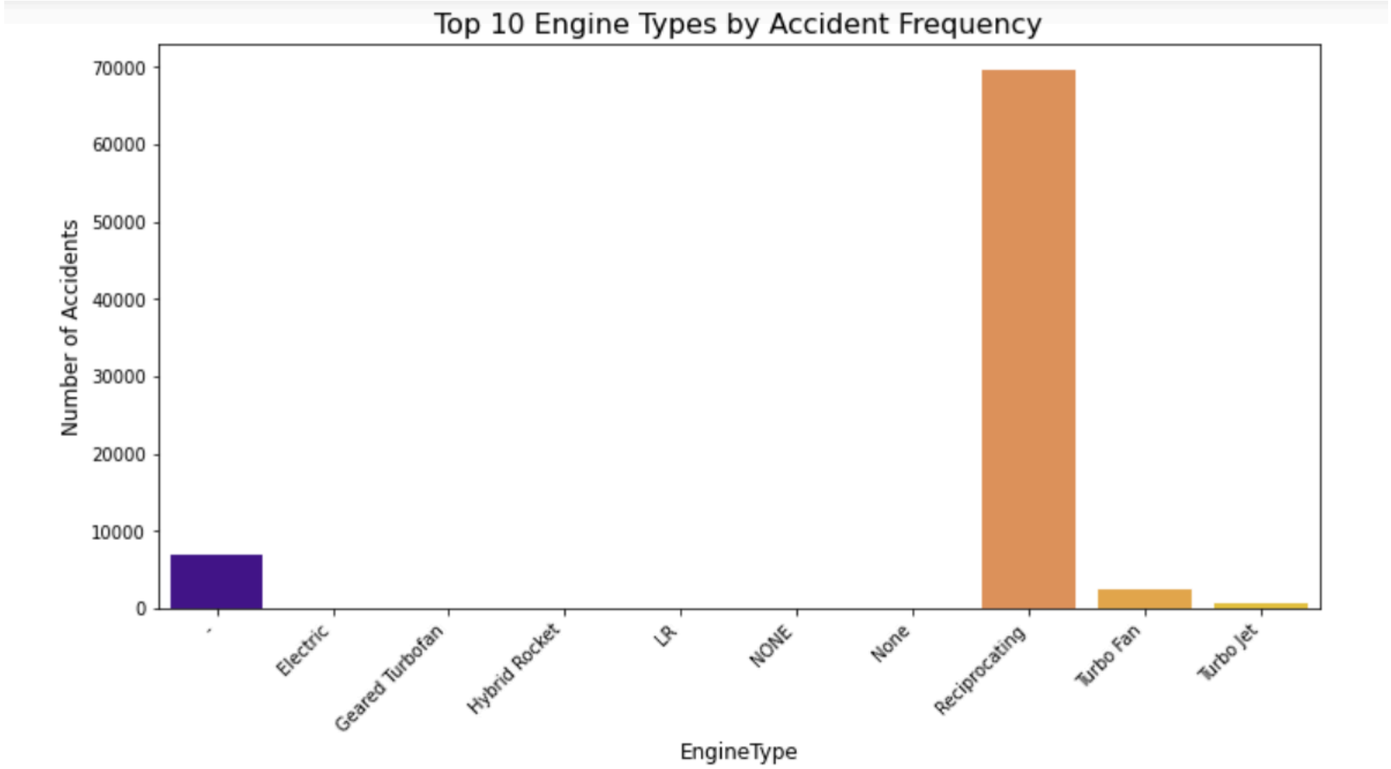
ANALYZING HOW PURPOSE OF FLIGHT INFLUENCES AIRCRAFTACCIDENTS



- The pie chart shows that the primary purpose of flight (55.6%) accounts for the majority of accidents, indicating that these flights either have the highest frequency or are associated with higher inherent risks.
- In contrast, Business/Commercial flights (4.5%) represent a smaller portion of the accident count, suggesting that specialized flights, such as military, medical, cargo, and chartered flights, contribute fewer accidents overall.

DATA ANALYSIS

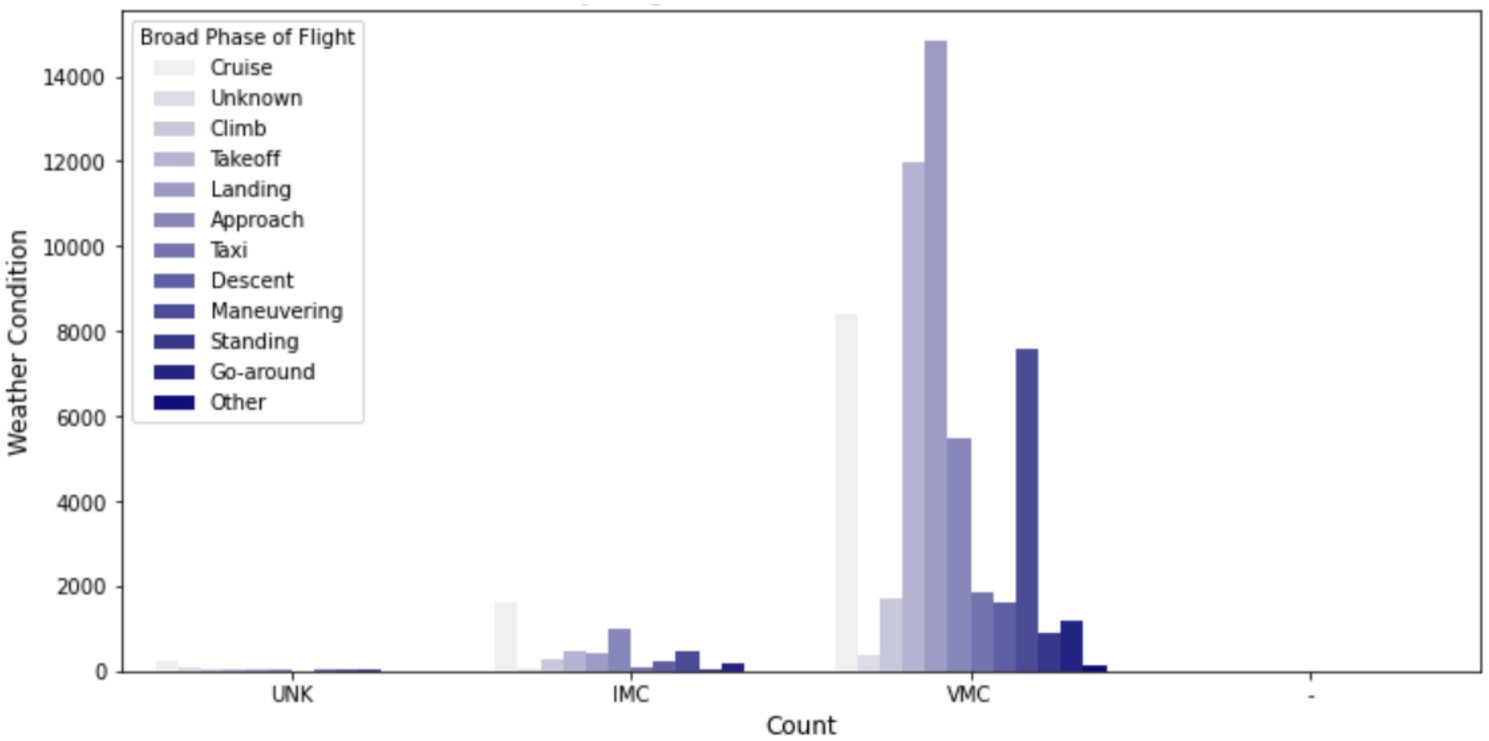
INVESTIGATING THE CORRELATION BETWEEN ENGINE TYPES AND AIRCRAFT ACCIDENTS



- Geared turbofan engines, leading the commercial aviation market, exhibit lower accident rates.
- In contrast, reciprocating and turbo shaft engines are linked to higher accident rates.

DATA ANALYSIS

EXAMINING HOW THE FLIGHT PHASES,WEATHER CONDITIONS AND AIRCRAFT ACCIDENTS ARE RELATED TO AIRCRAFTACCIDENTS



- Most accidents occur under VMC (Visual Meteorological Conditions), with landing and takeoff being the most accident-prone phases, followed by significant numbers in maneuvering and approach.
- IMC (Instrument Meteorological Conditions) accidents are less frequent but still present, while UNK (Unknown) weather conditions have minimal recorded incidents.
- Standing, taxi, and go-around phases account for the fewest accidents across all weather conditions.

CONCLUSION

- Cessna 152 and 172 have the highest accident rates compared to the Cessna 150M and Piper PA-28-161.
- Flights categorized under "primary purpose of flight" account for the majority of accidents (55.6%), likely due to high frequency or inherent risks.
- Business/Commercial flights contribute to a smaller proportion of accidents (4.5%), suggesting that specialized operations such as military, medical, cargo, and chartered flights experience fewer incidents.
- Geared turbofan engines, widely used in commercial aviation, have lower accident rates, while reciprocating and turbo shaft engines are associated with higher accident frequencies.
- The majority of accidents occur under Visual Meteorological Conditions (VMC), especially during critical flight phases such as landing, takeoff, maneuvering, and approach. While accidents in Instrument Meteorological Conditions (IMC) are less common, they are still contributors . Incidents in unknown weather conditions are minimal, and the lowest accident rates are observed during standing, taxi, and go-around phases across all weather conditions.

RECOMMENDATIONS

1. **Aircraft Safety Enhancements**

- Strengthen safety measures for Cessna 152 and 172 due to high accident rates.
- Provide targeted training for pilots operating these aircraft.

2. **Flight Purpose Risk Management**

- Introduce stricter safety protocols for "primary purpose of flight" operations.
- Align general aviation with commercial aviation safety standards.

3. **Engine Type Considerations**

- Encourage the use of geared turbofan engines for their lower accident rates.
- Improve maintenance and operational guidelines for reciprocating and turbo shaft engines.

RECOMMENDATIONS

5. **Weather-Related Safety Improvements**

- Enhance pilot training for VMC, focusing on landing, takeoff, maneuvering, and approach.
- Strengthen IMC navigation training and safety measures.

6. **Accident Prevention in Flight Phases**

- Reinforce safety measures for landing and takeoff.
- Optimize taxi, standing, and go-around procedures to maintain low accident rates.

NEXT STEPS

1. Enhance Aircraft Safety & Training by implementing targeted safety protocols for Cessna 152 and 172, reinforce procedures for critical flight phases like landing, takeoff, and approach, and maintain safety in low-accident operations such as taxiing and go-arounds.
2. Mitigate High-Risk Flight Operations by strengthening safety measures for flights with high accident rates, improve weather-related training for VMC and IMC conditions, and ensure pilots are better prepared for varying flight environments.
3. Optimize Aircraft Performance & Maintenance through promotion of the the usage of geared turbofan engines and enhance maintenance practices for reciprocating and turbo shaft engines to ensure reliability and efficiency.

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Thank you