Risk Assessment and Aircraft Selection for Commercial and Private Aviation Expansion

AN ASSESSMENT OF RISKS INVOLVED IN RUNNING FLIGHTS TO INFORM A COMPANY A DECISION ON WHETHER TO INVEST IN COMMERCIAL OR PRIVATE ENTERPRISES FLIGHTS.

Background

- The company has a desire to expand its portfolio. The company is looking at getting into flight operations. Being a new field to the company, its risky and therefore important to assess the risks involved. I will use available historical data to assess the risks involved. I will advice the company based on what is less risky between commercial and private enterprises airplanes.

Problem Statement

- As the company expands into the aviation industry, it faces a critical decision in selecting the most appropriate aircraft for commercial and private operations. However, the company has limited knowledge of the risks associated with different types of aircraft and flight purposes. The primary objective is to analyze historical aviation data to identify which aircraft present the lowest risk for business and personal flights, enabling the company to make informed purchasing decisions that align with safety and operational efficiency. This analysis aims to provide actionable insights based on injury trends, aircraft performance, and other relevant factors, ensuring that the company can confidently invest in the aviation sector while minimizing risk.

Objectives

i. Assess Aircraft Risks: Analyze historical aviation data to identify aircraft types with the lowest risk, focusing on factors such as injuries, accidents, and aircraft damage.

ii. Compare Business and Personal Flights: Compare the risks associated with business and personal flights to determine which category of flights presents a lower risk for the company's potential operations.

iii. Identify Patterns in Injuries: Examine the relationship between the purpose of flight and the severity of injuries (fatal, serious, minor, or no injuries) to understand which flight purposes tend to be more hazardous.

iv. Provide Actionable Insights: Translate the findings from the analysis into recommendations for the aviation division, helping them make informed decisions regarding aircraft purchases.

v. Support Strategic Decision-Making: Use statistical testing and visualizations to offer data-driven insights that will guide the company in selecting safe and reliable aircraft for its expansion into the aviation industry.

Data Cleaning and Preparation

The dataset provided for this analysis contained missing values, particularly in critical fields such as injury counts, weather conditions, and flight purposes. To ensure accurate insights:

- Missing values in categorical fields like Location, Country, and Weather Condition were filled with "Unknown."
- Injury-related fields (Total Fatal Injuries, Total Serious Injuries, Total Minor Injuries, Total Uninjured) were filled with zeros, assuming missing values imply no injuries.
- Unnecessary columns with high missing values, such as Aircraft Category and Schedule, were dropped.

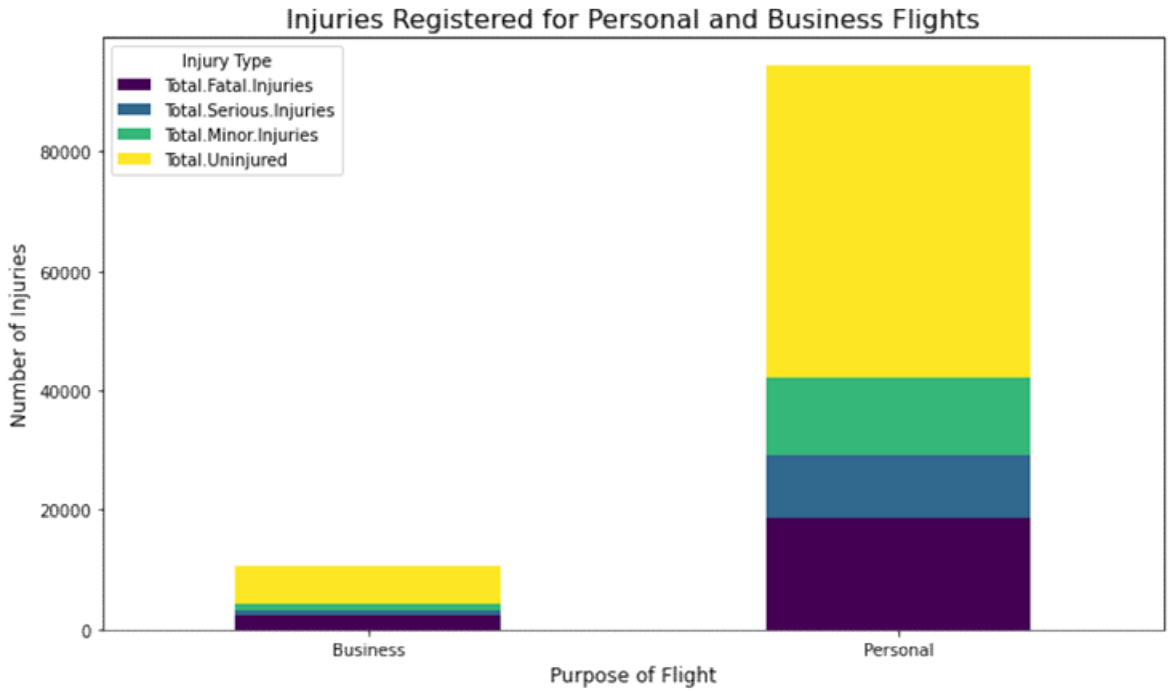
Data analysis

The data analysis focused on understanding the relationship between the purpose of the flight and the injuries recorded. A comparison between personal and business flights revealed the following:

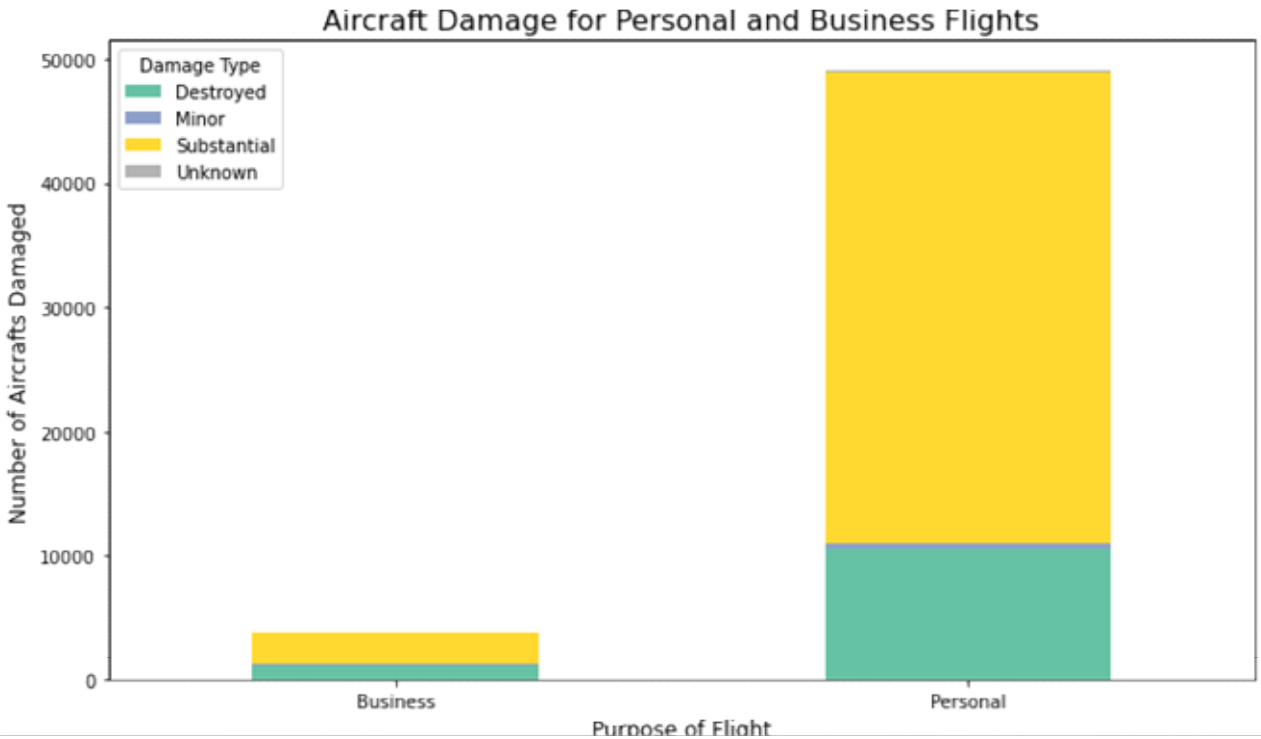
- Personal Flights: These exhibited a higher number of total injuries compared to business flights.
- Business Flights: There were fewer incidents and injuries, suggesting that business flights might involve less risk.

This initial finding suggests that business flights could be lower risk based on the available injury data.

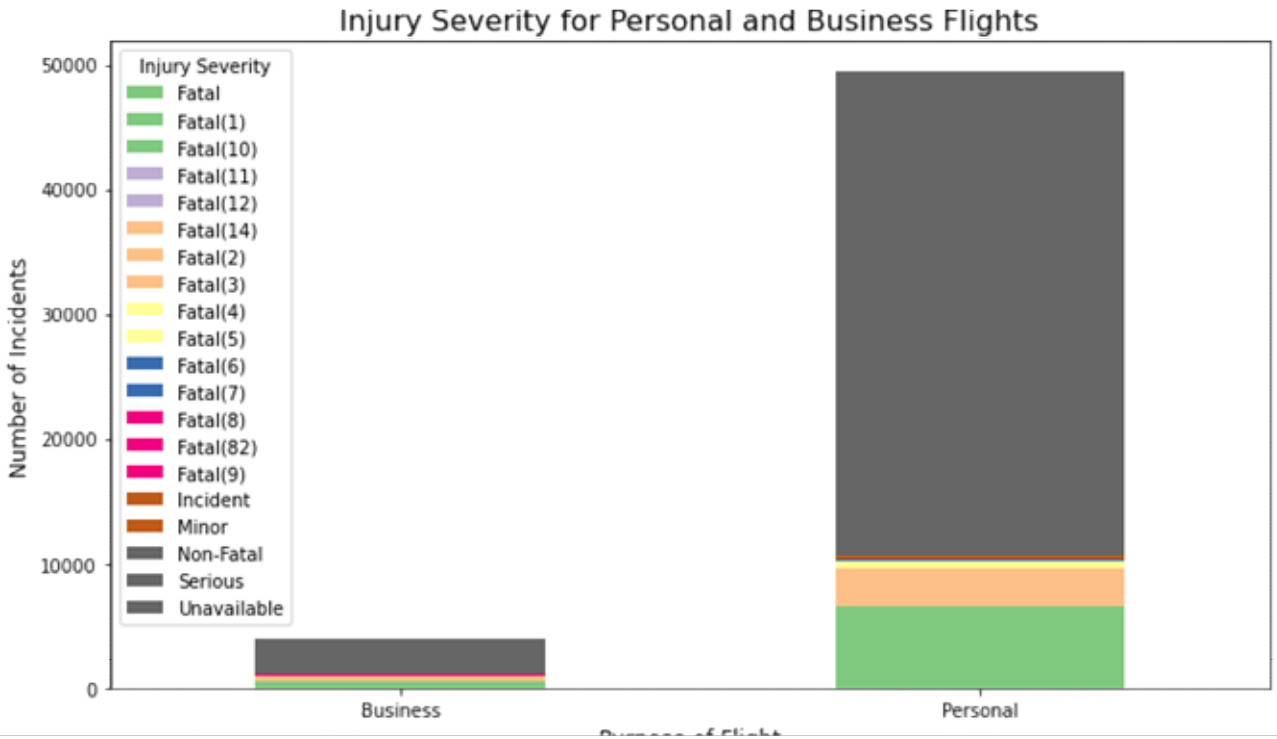
Injuries Registered for Personal and Business Flights



Aircraft damage



Injury severity



Observations.

Based on the graphs above, these are my observations:

1.Business flights have fewer accidents and lower injury severity compared to personal flights.

2. Higher Risk in Personal Flights: Personal flights are associated with more serious accidents and fatalities. This may be due to less rigorous safety checks, pilot inexperience, or the use of older, less-maintained aircraft.

3. Personal flights report higher rates of severe injuries and fatalities, making them a higher-risk segment for the company. This emphasizes the need for strict safety measures if entering the private flight sector.

4. The safety advantages of business flights underscore the importance of operational oversight. Implementing commercial-grade oversight protocols, even for personal or private aircraft, could mitigate risks.

Recommendations

1.Business flights appear to be less risky in terms of injury severity compared to personal flights. The company should consider prioritizing aircraft for business purposes when making purchasing decisions, as they demonstrate lower injury risk based on historical data.

2.Aircraft models that consistently show fewer incidents and lower injury severity should be considered for purchase. Emphasize safety records and proven reliability when evaluating potential aircraft for the fleet.

3. To minimize risks further, it's advisable to implement regular maintenance checks and safety audits. This will ensure that the company's aircraft fleet remains in optimal condition, reducing the potential for accidents or injuries.

4. Continuously monitor aviation industry data and trends to adjust aircraft purchase strategies based on the latest safety records. This data-driven approach will ensure the company adapts to emerging risks in the aviation sector

Thank you. God bless.