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PHASE 1 PROJECT

IDENTIFYING AN OPTIMAL AIRCRAFT TO PURCHASE FOR AERODYNAMICS LIMITED COMPANY.

BACKGROUND

❖ The aviation industry is multifaceted with numerous factors influencing the decision to purchase an aircraft. By considering the purpose, range, cost, safety, technology and regulatory compliance ,buyers can make informed decisions

❖ Additionally ,staying aware of industry trends and challenges can help in selecting the most optimal aircraft for their needs. It is however important to remember that there are many other factors to consider.

❖ Aerodynamics Limited Company, a leader in the aerospace industry, is embarking on a strategic expansion to diversify its portfolio by entering the commercial and private aviation sectors. This move aims to leverage the company's expertise in aerodynamics and engineering to tap into new market opportunities and drive growth.

❖ As part of this expansion, the company faces the critical challenge of identifying the most suitable aircraft that pose the lowest risk for their new business venture. This involves a comprehensive analysis of various aircraft options, considering factors such as safety, operational efficiency, cost-effectiveness, and market demand.

❖ The goal of this project is to conduct thorough research and provide actionable insights that will guide the head of the new aviation division in making informed decisions about aircraft procurement. By selecting the optimal aircraft, Aerodynamics Limited Company aims to ensure a successful entry into the aviation market, minimizing risks and maximizing returns.

PROBLEM STATEMENT

❖ Aerodynamics Limited Company is diversifying its portfolio by entering the commercial and private aviation sectors. To successfully launch this new venture, the company needs to identify the aircraft that present the lowest risk. This project aims to conduct thorough research and provide actionable insights to assist the head of the new aviation division in making informed decisions about aircraft procurement.

DATA ANALYSIS

❖ We used a database from NTSB aviation which contains information from 1962 up to 2021 about civil aviation accidents and selected incidents within the United States ,its territories and possessions, and in international waters.

❖ Firstly, we begun by understanding the data and identify the relevant columns for the research and dropped the irrelevant parts. We then proceeded to clean the data by removing the outliers and any null values and capitalized the column titles. We identified the data types for the different columns then plotted a boxplot to check for outliers.

❖ We then converted the cleaned data to a csv file and proceeded to analyze the data. The first step was plotting the total fatal injuries over the years and from the plot it was evident that the fatalities reduced significantly over time.

❖ The bivariate analysis involved model of aircraft versus total fatal injuries to identify the models with the most fatal injuries while the multivariate analysis involved models, fatal injuries and aircraft engine type.

FINDINGS

- In our analysis we made several plots representing a univariate, bivariate and multivariate relationship of the specific variables which include; fatal injuries, model of aircraft and engine type. Below are some of the plots:
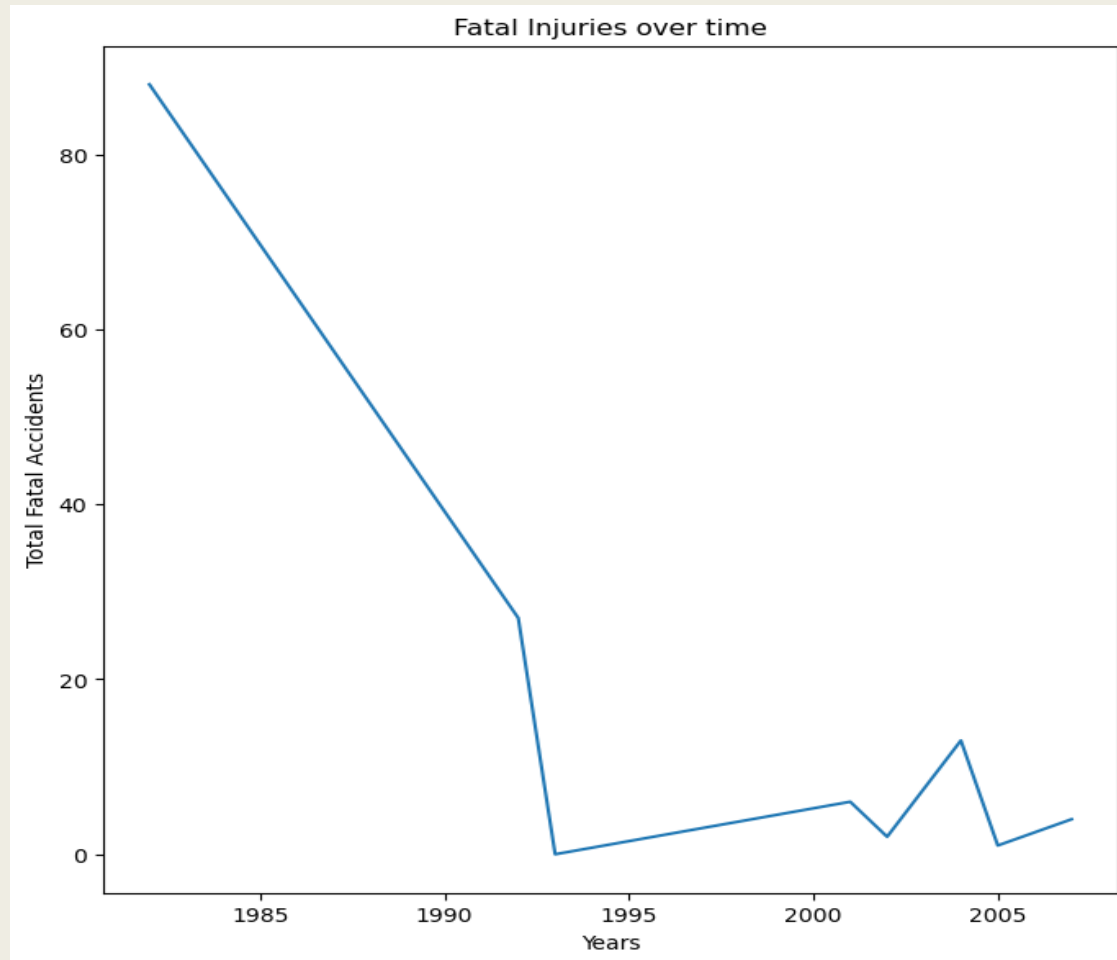
The graph shows a sharp decrease in total fatal accidents from over 80 in 1985 to around 20 by 1990. This significant reduction is attributed to improvements in aviation safety measures, better aircraft technology and stricter regulatory oversight during this period.
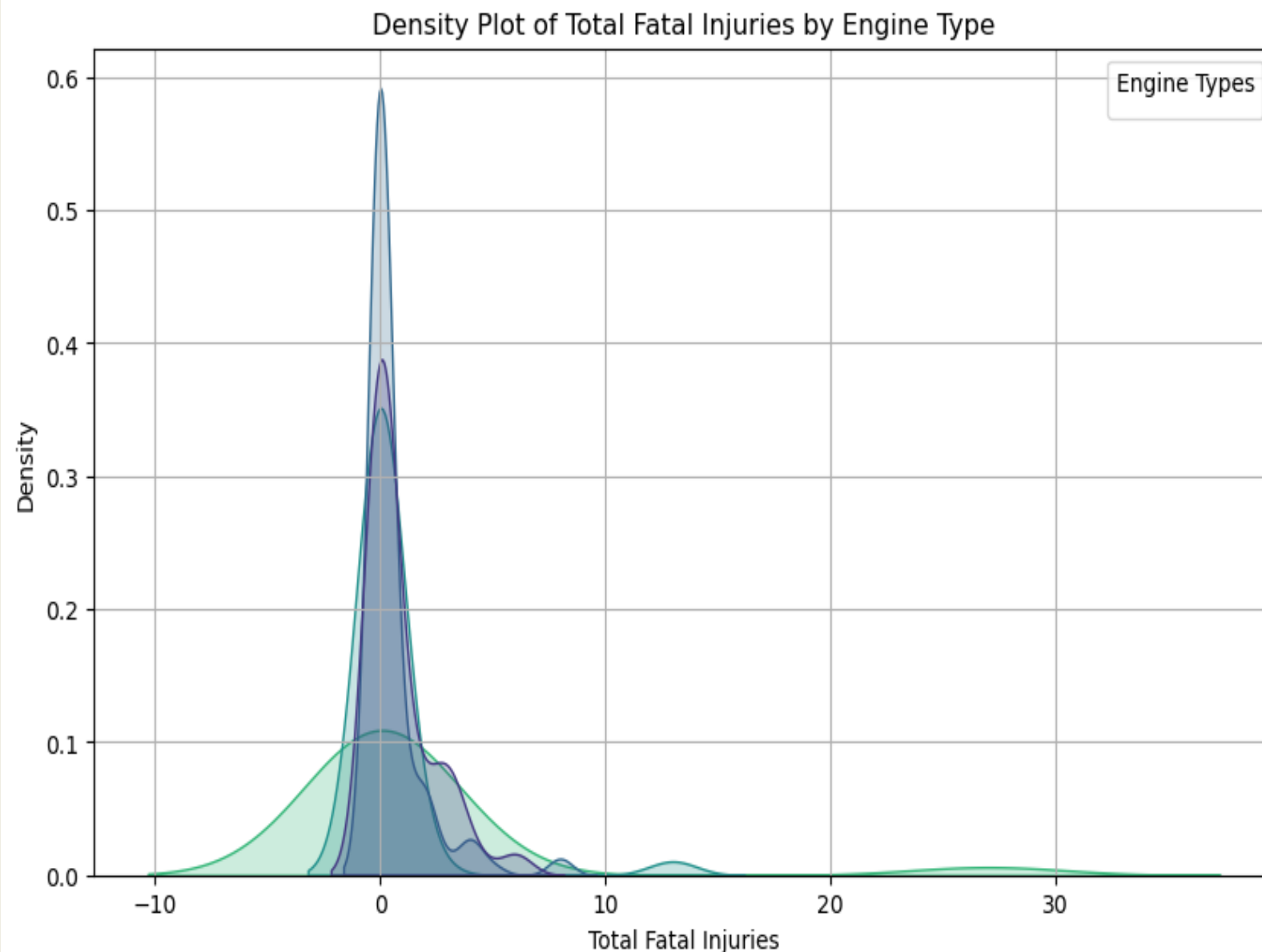
Figure 1

FINDINGS

Figure 2
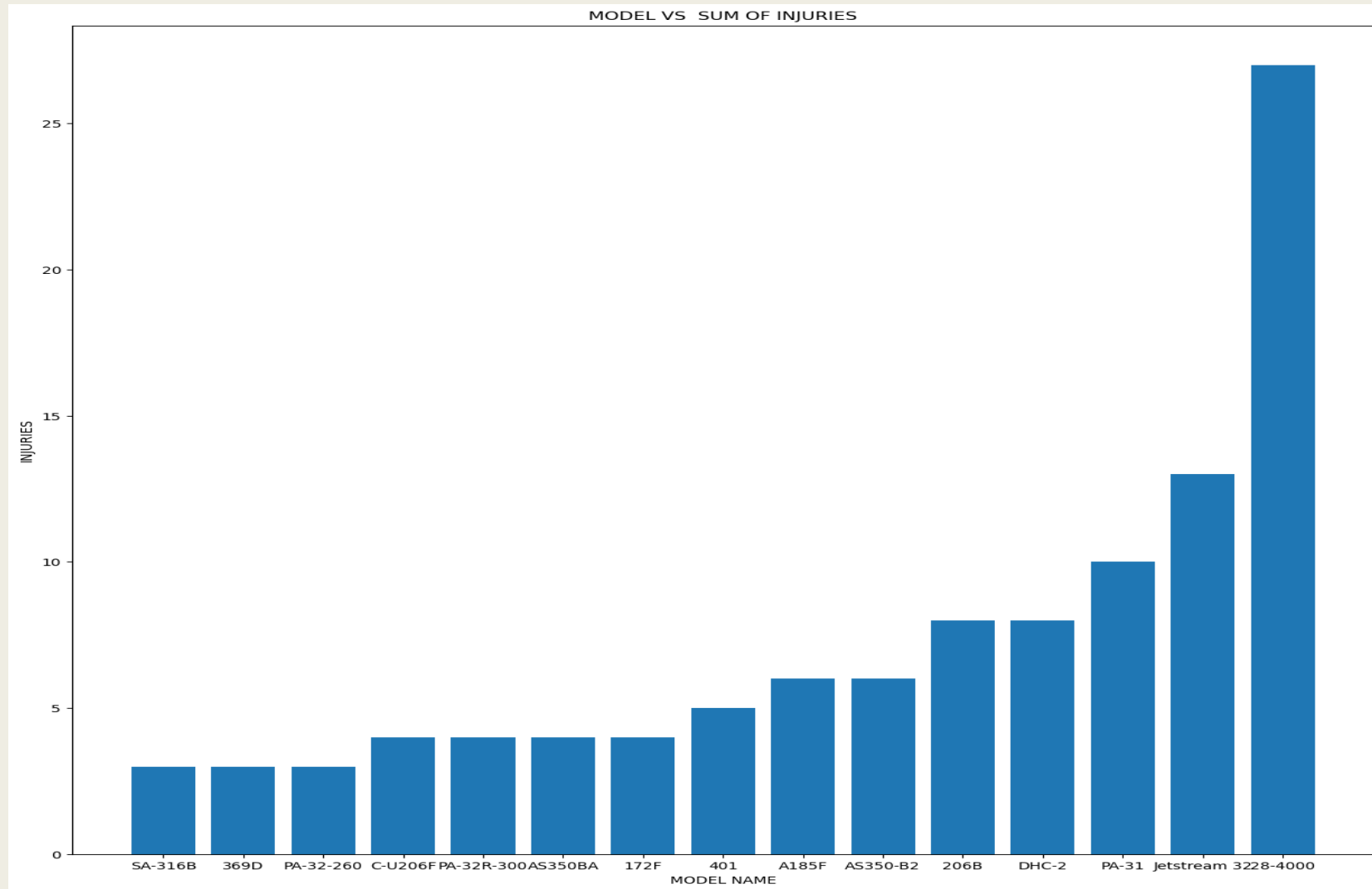
The bar chart compares the number of injuries associated with different aircraft models. Most have fewer than 10 injuries however model 322B-4000 stood out with over 20 injuries. These are therefore highlighted as the riskiest models.

FINDINGS

Density Plot of Total Fatal Injuries by Engine Type

- The density plot above shows the distribution of total fatal injuries by engine types.
- The x axis represents the number of fatal injuries while the y axis shows the density or frequency of occurrences. Each plot represents a different engine type.
- One plot has a sharper and higher peak indicating a more concentrated range of values for total fatal injuries.
- This plot aids in understanding the safety performance of different engine types by visualizing the frequency and severity of fatal injuries.

Conclusion

From the analysis its is evident that making an investment in this industry is worthwhile as the fatalities have significantly declined over the years. Identifying the model and engine type with the most fatalities leaves us with the optimal models and engine types to choose from when purchasing the aircrafts. However it is important to note that these are not the only factors to consider when intending to purchase an optimal aircraft. There are other factors like FAR description, purpose of flight and many others to mention.

Recommendations

- The highlighted aircrafts with the most fatal injuries should not be an option during purchase.

- The company should consider aircraft engine type when making the purchase to avoid risky models .

- The company should proceed with investing in the industry as it proves to be lucrative given the significant decline of fatal injuries over the years.