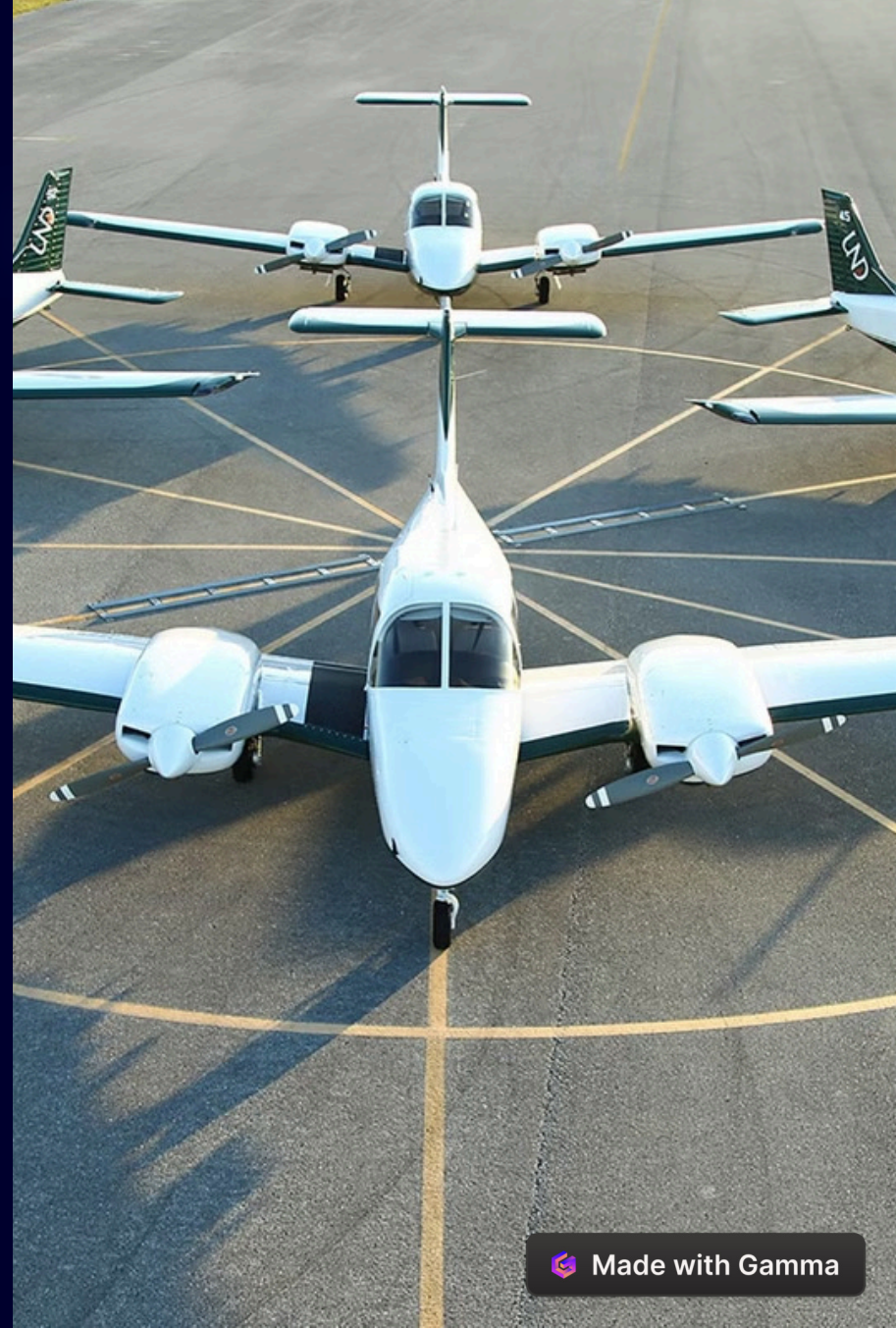
VANGUARD CO. AIRCRAFT INSIGHT



INTRODUCTION

Vanguard, a Business Conglomerate, is interested in expanding its portfolio and has set its scope on purchasing and operating planes for both private and commercial enterprises. However, with no prior experience in the aviation sector, the company needs guidance on which airplanes to invest on as diffrerent airplanes pose different risk factors. In order to provide guidance to the company, intensive research on different airplane data will be done in order to generate insight on which airplanes pose the lowest risks. The insight will be used by the head of the new aviation division in deciding on which airplanes to purchase and operate.

Objectives

1. Identify the airplane models and manufacturers with the lowest accident rates.
2. Determine which airplane engine types are associated with the lowest crash rates.
3. Identify the safest airplane operations with the lowest incidence of plane crashes.

Steps taken in the analysis

These were the steps that were followed in order to fulfill the objectives of the study:

1

Data Sourcing and Understanding

Obtaining the data and identifying its qualities and attributes

2

Data Analysis and Visualization

Analysing the data and plotting the results

3

Findings and Recommendations

Provide results of analysis for decision making

Data Sourcing and Understanding

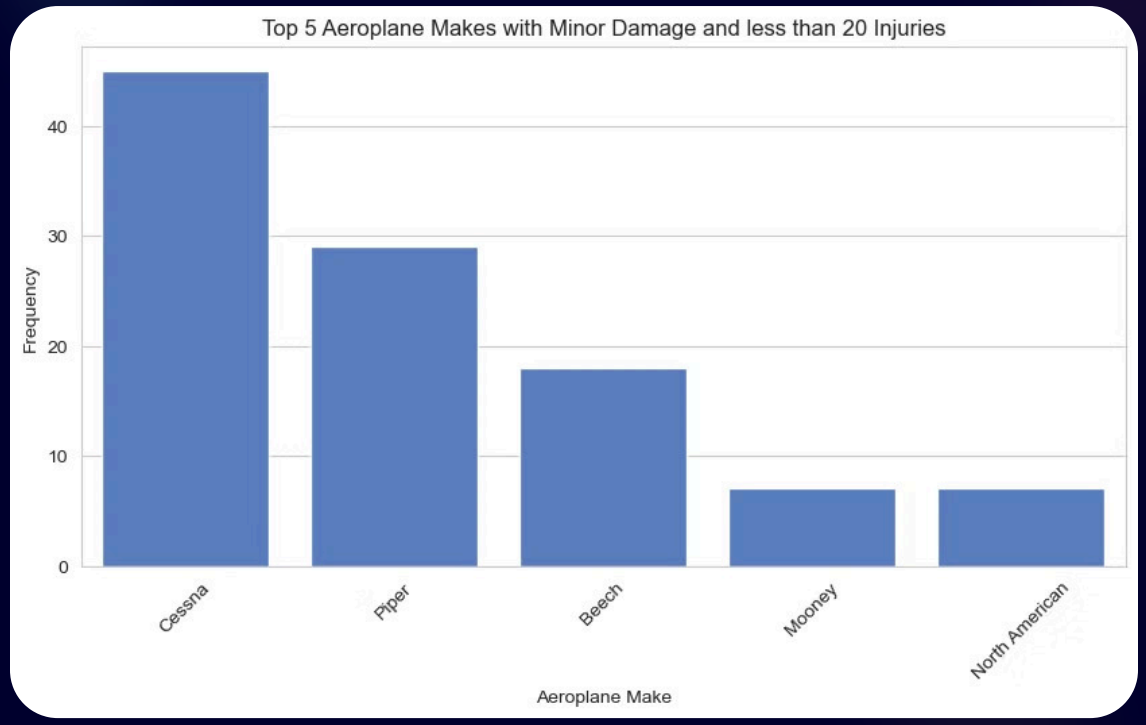
The data to be used in the analysis was gotten from Kaggle, a data science platform.

The particular dataset was from the National Transportation Safety Board (NTSB). This dataset is comprised of aviation accidents data from 1962 to 2023 about civil aviation accidents and selected incidents within the United States, its territories and international waters. This makes the data relevant to this study as it includes all the relevant information regarding the accidents (the aircraft type, type of flight, the engine type, and the weather during the incident). All this data will make it possible to fulfill the objectives of the study.

Data Analysis and Visualization

Objective 1: Identify the airplane models and manufacturers with the lowest accident rates.

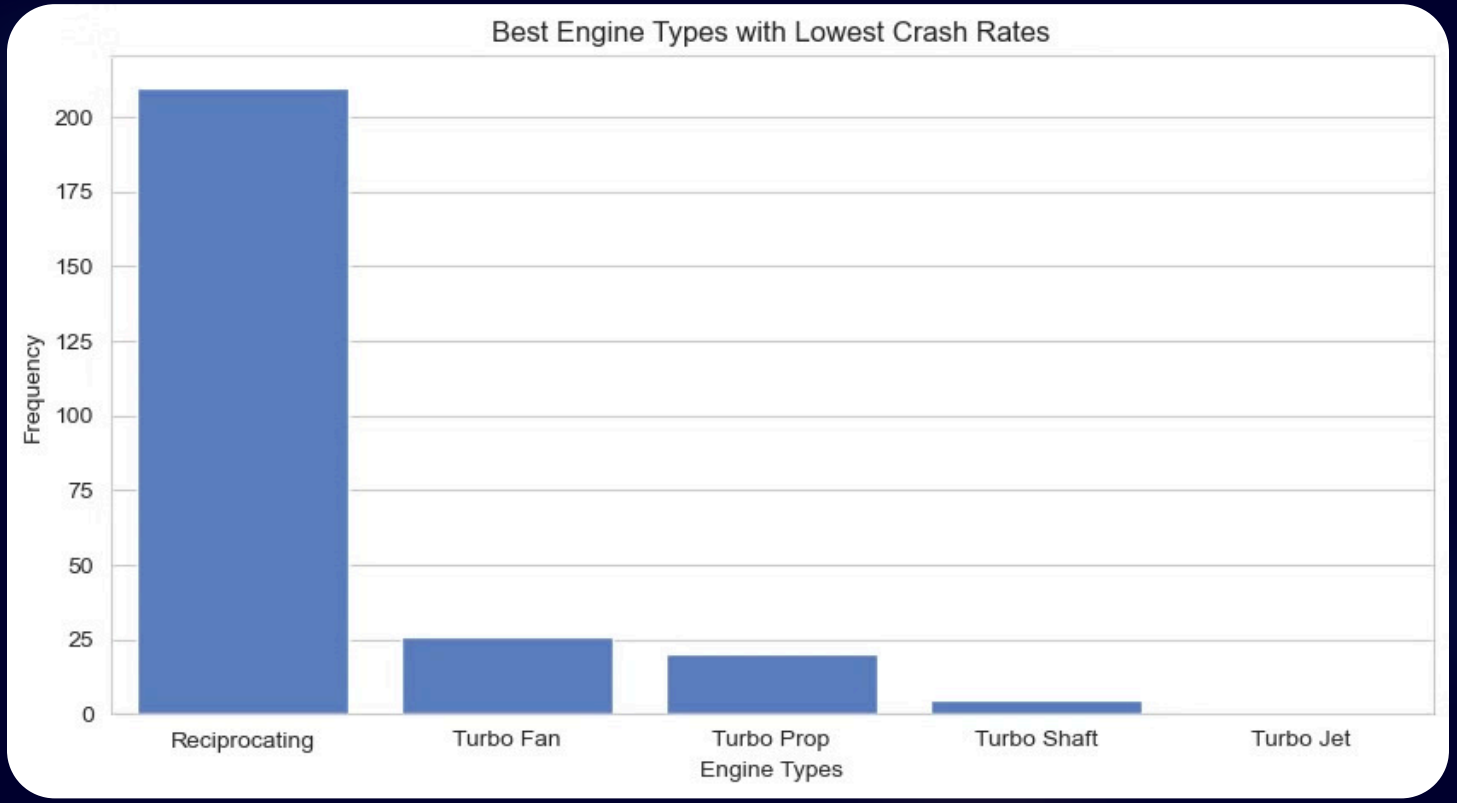
This analysis was conducted by examining which airplane makes and models appear the least in the dataset, as well as assessing the extent of damage sustained in accidents.



Cessna, Piper and Beech aircraft stood out as having most of their models having one crash, had minor damage during the crash and total injuries not exceeding 20. The best models for these planes are highlighted below:

Objective 2: Determine which airplane engine types are associated with the lowest crash rates.

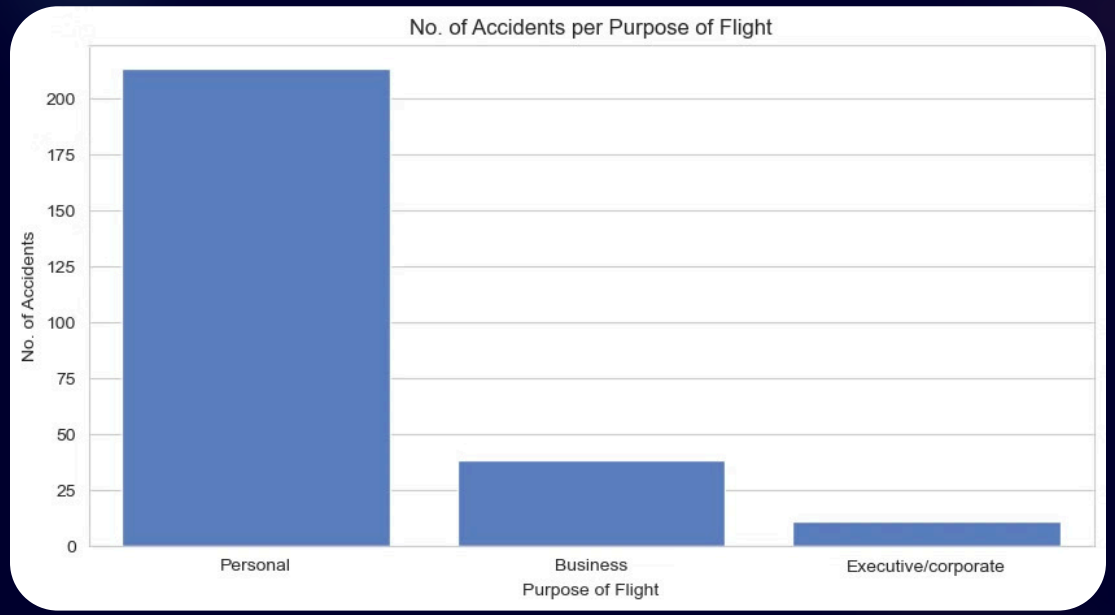
The second objective wwas be to check which the types of engines of aircraft that were used by planes that had the lowest crashes. This will help in establishing which engine types are the most reliable and not prone to failure.



The three best engines to use are the Reciprocating, Turbo Fan and Turbo Prop respectively.

Objective 3: Identify the safest airplane operations with the lowest incidence of plane crashes.

This objective will aim to uncover the safest airplane operations that put the plane to the lowest risk of an accident. The insight derived from this will help quide Vanguard on choosing which operations to focus on and which to avoid in order to lower the probability of a plane crash.



Most plane that crashed were being operated for private means while planes used for executive/corporate purposes had the least amount of crashes.

Findings and Recommendations

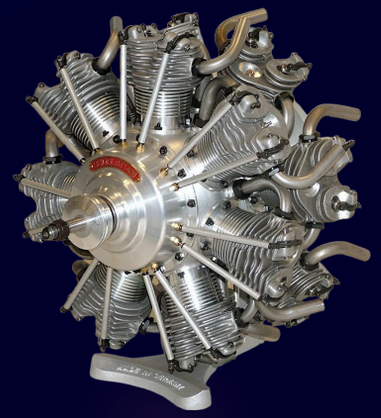
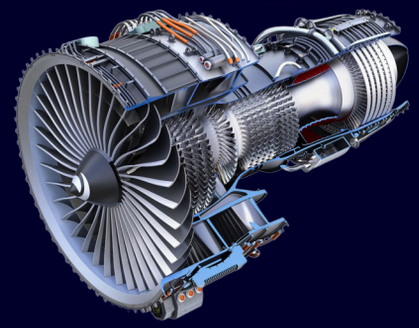
Objective 1: Identify the airplane models and manufacturers with the lowest accident rates.

There were a lot of airplane manufacturers with records of only one accident accross their fleet so filtering was done to only remain with planes which sustained minimal damage after the crash and also had less than 20 total injuries. The planes that stood out were Cessna, Piper and Beech.

Index	**Cessna**	**Piper**	Beech
1	172M	Pa-46-310P	58
2	402B	Pa-46-500Tp	V35
3	560	Pa28R	200
4	R182	Pa-32Rt-300T	C24R
5	525	Pa-31T1	A36

Objective 2: Determine which airplane engine types are associated with the lowest crash rates.

The three engine types that were common in airplanes that had only one recorded accident were **Reciprocating, Turbo Fan** and **Turbo Prop engines**. However, reciprocating engines are not involved in many accidents since they are quite old engines and pretty hard to find in modern planes. It will be advisable to consider the Turbo fan and Turbo prop engines when the planes are being purchased since they have a good track record and seem reliable and not prone to failure. These engines are also very fuel efficient and adhere to the noise regulations.

Reciprocating	Turbo Fan	Turbo Prop
		

Objective 3: Identify the safest airplane operations with the lowest incidence of plane crashes.

Planes used in the private enterprise have a higher probability of crashing while planes used in the business and executive/corporate sector have the lowest probability of crashing. This is because many private pilots may have less training, fewer flight hours, and less experience handling emergencies compared to corporate pilots. Moreover, planes used in the commercial sector tend to be more advanced and have advanced avionics and safety features. When operating the planes in the private sector, it will be advisable not to procure the plane to individuals who are not well versed with the operation of that particular plane model.

Conclusion

The insight derived from this will be used by relevant stakeholders in making an informed decision on which airplanes to purchase and operate and for what purpose in order to reduce the chances of a crash.