Aviation Accident Database & Synopses, up to 2023

Analysis and Findings

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Overview

This project reviews data from the NTSB aviation accident database contains information from 1962 upto 2023 about civil aviation accidents and selected incidents within the United States, its territories and possessions, and in international waters .As the company expands into new industries, it acknowledges the crucial need to assess and manage the risks linked to aircraft operations. Although the aviation sector is profitable, it involves inherent risks that require careful analysis to ensure well-informed purchasing decisions.

1. Understanding the problem

First of all before we venture into Aviation it is crucial to Identify the challenges and issues that may be involved in this field

- ➔ **How is the state of Aviation safety over the last few Decades**
  We want to see if the state of safety is improving or degrading
- ➔ **What are the causes of Aviation Accidents**

  What are the major makes ,weather conditions and Engine types involved in Aviation Accidents
- ➔ **Which Country and states are most involved in Aviation Accidents**
  Provide a simple outlook of which regions are heavily impacted especially in the USA

2.Business Understanding

Business understanding

The company seeks to broaden its portfolio by venturing into the aviation sector, intending to acquire and manage aircraft for both commercial use and private uses. The objective is to pinpoint the aircraft that carry the most risk, thereby ensuring safety through the actions to be taken and reducing potential liabilities. This information will guide the purchasing decisions for the new aviation division, focusing on safety and reliability.

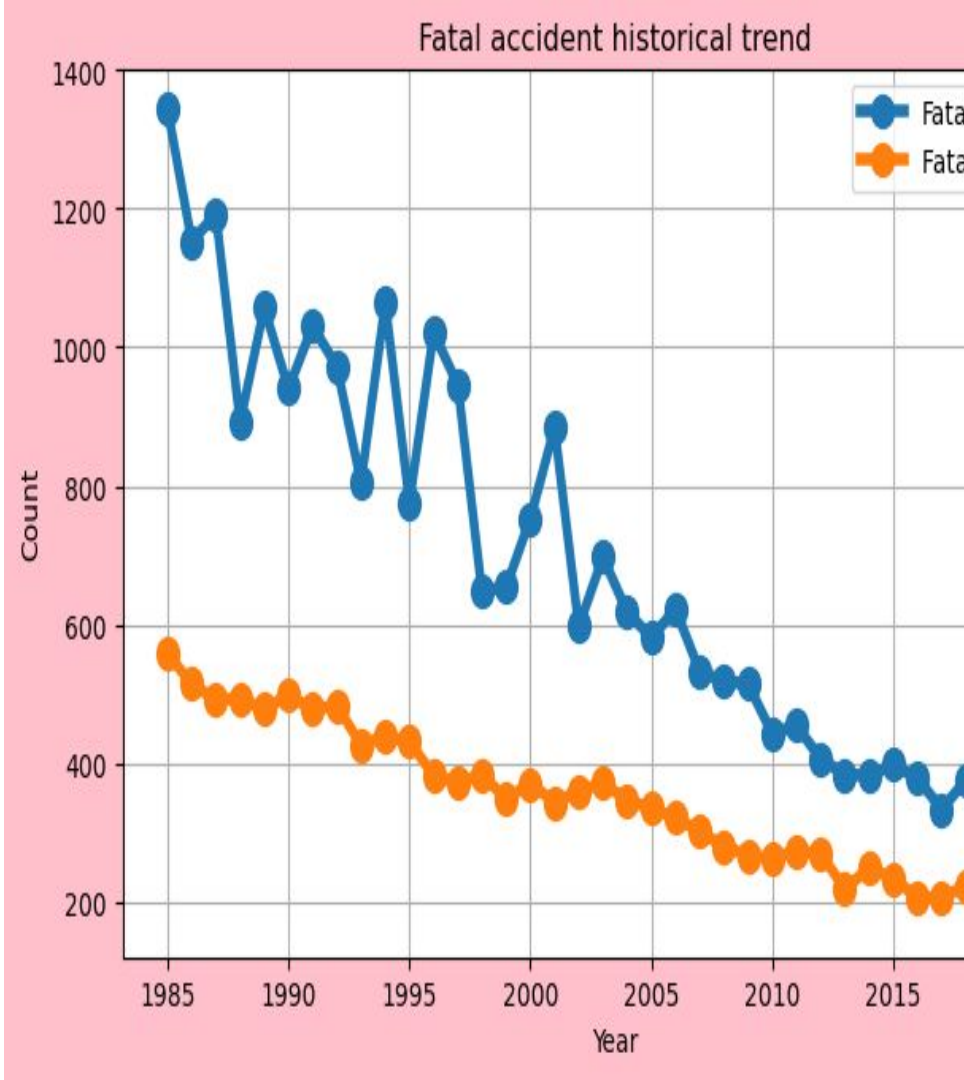
3.Data Understanding

Understanding the Data.

The dataset includes temporal data with incident dates and information on accident identification from National Transportation Safety Board (NTSB) and it is available on Kaggle upto **2023** such as distinct event identifiers and inquiry kinds. There is location information available, including precise locations and countries of occurrence; nevertheless, there is up to 40% missing data in certain variables.

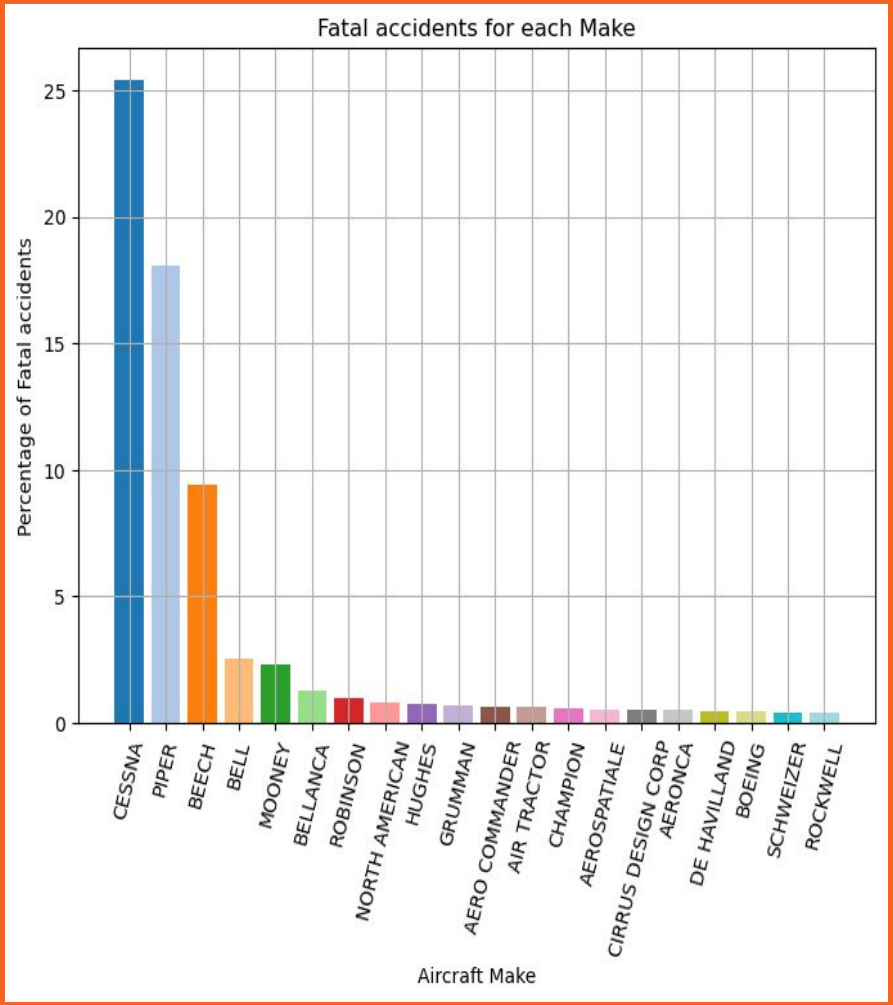
THE FATAL ACCIDENT TREND FOR THE PAST FEW DECADES

We Can see there is a Down-trend of the recorded Fatal cases of aviation incidents which suggests an improvement over the decades
It is a sign of hope and that things are actually getting better



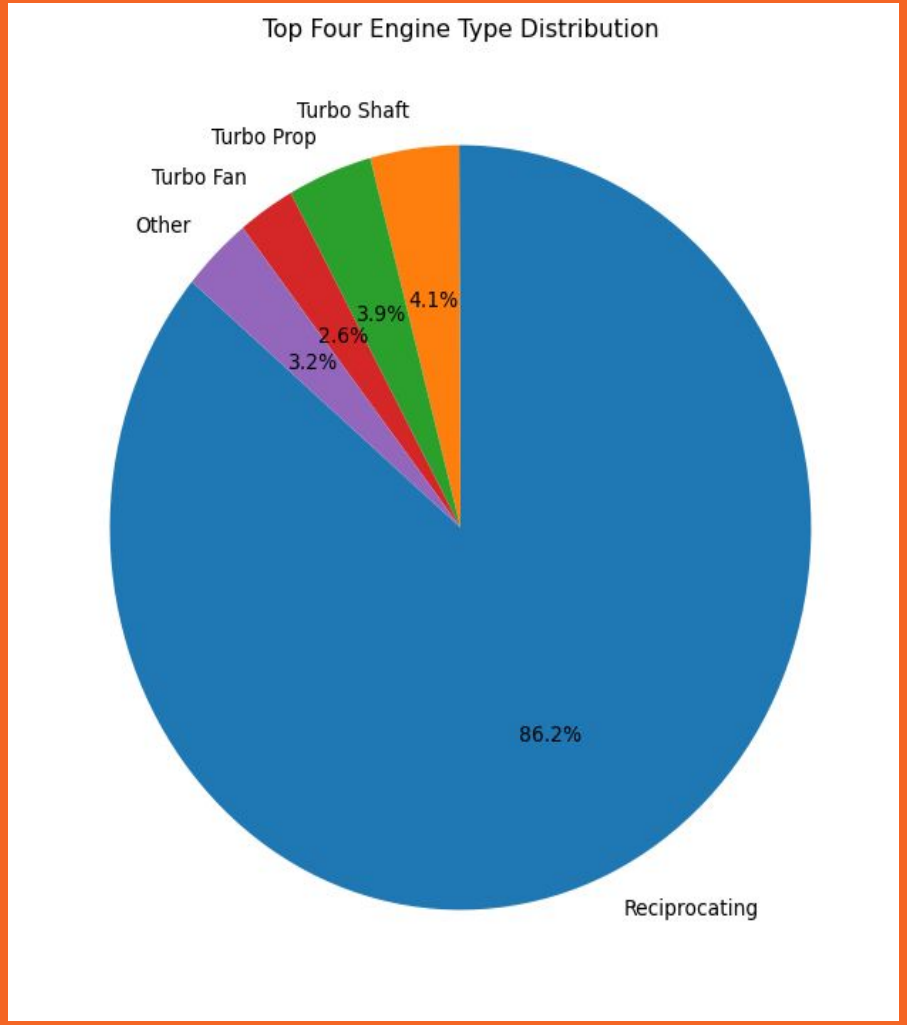
THE AIRCRAFT ‘MAKES’ THAT ARE MOST INVOLVED IN AVIATION ACCIDENTS

These are the top 20 makes of aircrafts involved in Accidents and also the CESSNA ,PIPER and BEECH have the highest entries



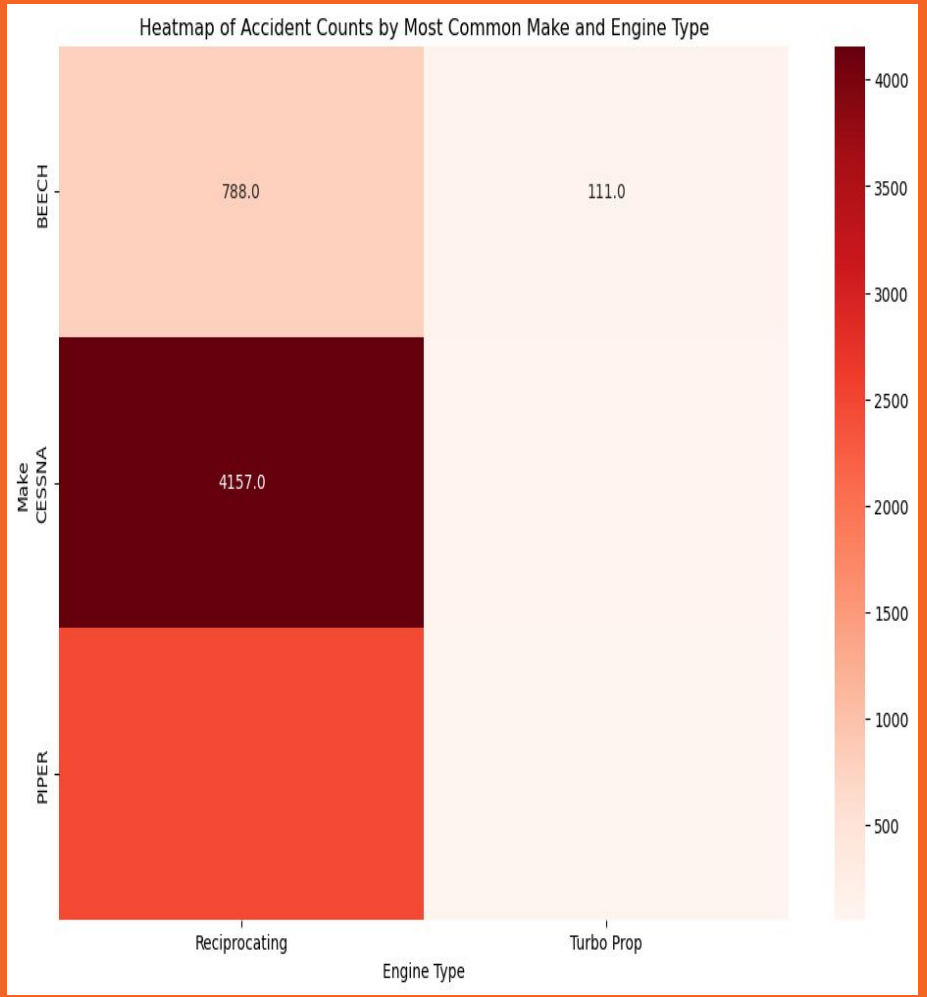
THE ENGINE TYPES THAT ARE MOST INVOLVED IN AVIATION ACCIDENTS

These are the top 5 types of Engines involved in Accidents and the Reciprocating Engines have the highest involvement in Accidents



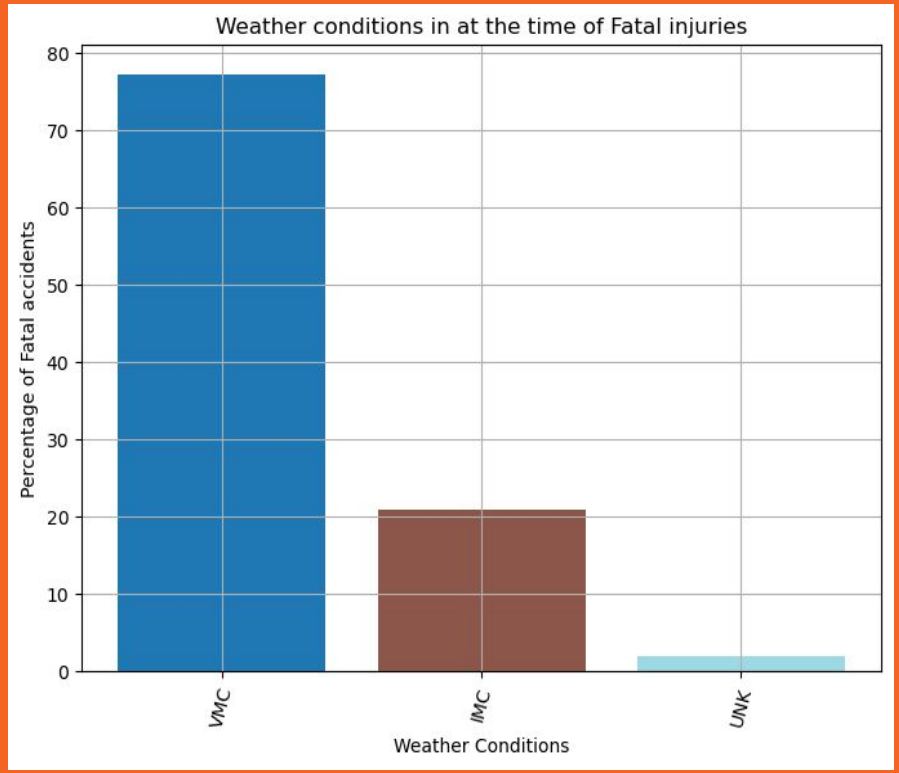
THE RELATION OF ENGINE TYPES AND ‘MAKE ’THAT ARE MOST INVOLVED IN AVIATION ACCIDENTS

This Heatmap visualisation shows that the Make of aircraft especially CESSNA have a correlation with the engine type ‘Reciprocating’ with having the highest incidents of accidents
Further research stated that Reciprocating Engines will crash due to the wrong type of fuel in their tanks



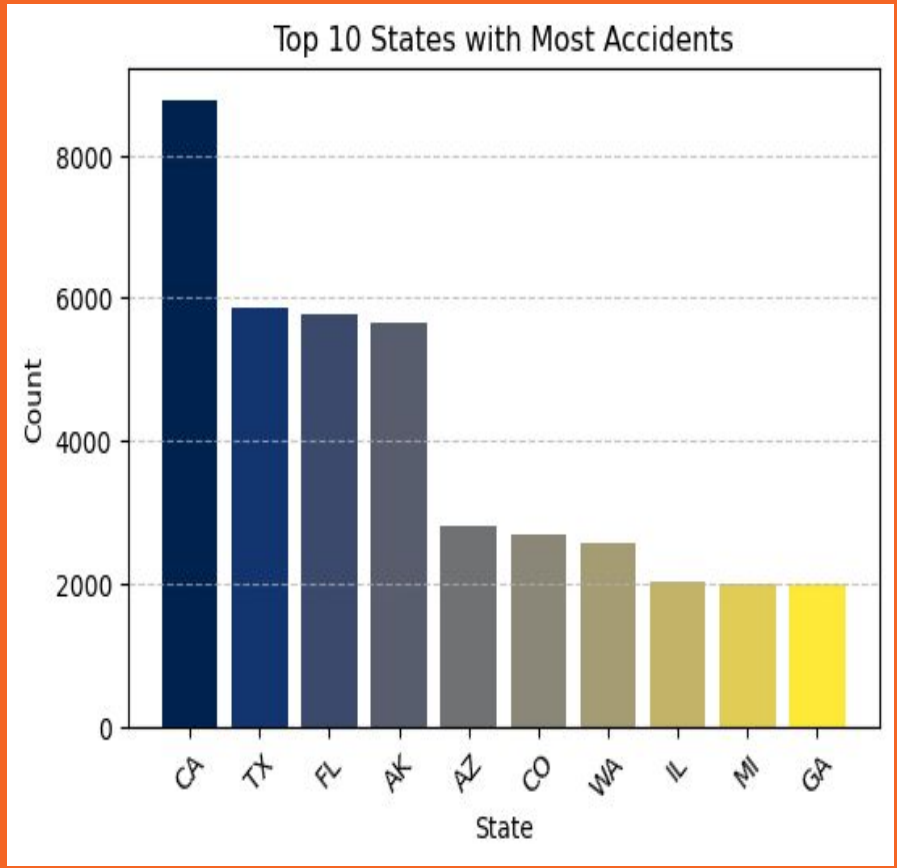
THE WEATHER CONDITION THAT IS MOST INVOLVED IN AVIATION ACCIDENTS

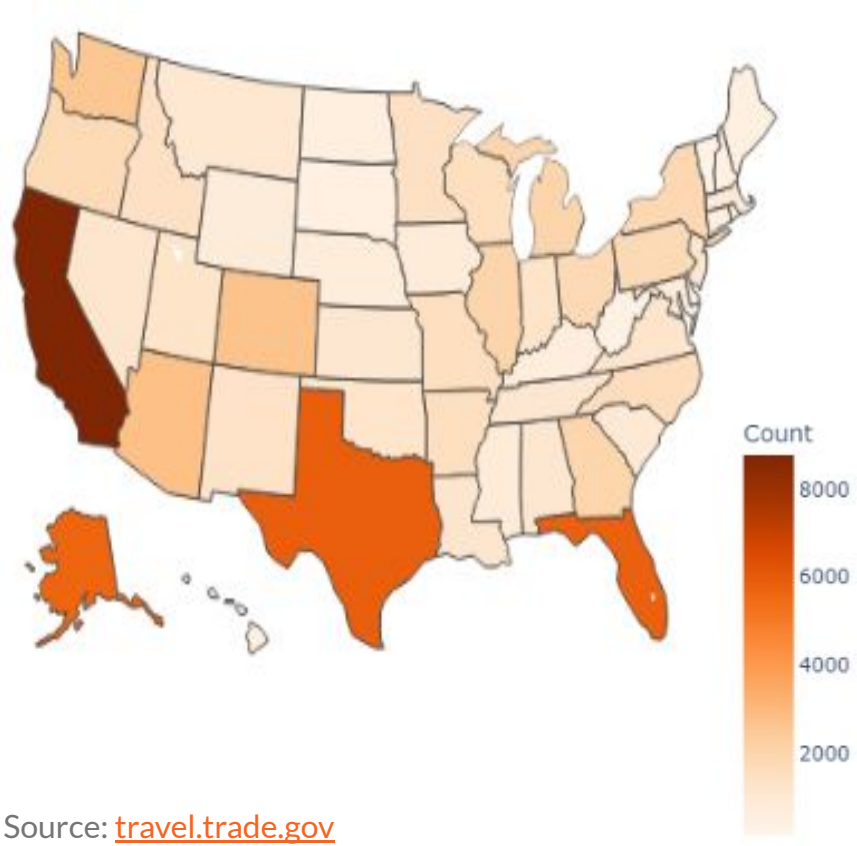
This Bar graph visualisation shows that the VMC weather condition is the leading cause of Aviation incidents because, the perceived safety and ease of VMC can lead to complacency, overconfidence, and a higher incidence of accidents resulting in a lot of fatal injuries.



THE TOP TEN STATES WITH MOST ACCIDENTS

This Bar graph visualisation shows the leading states in Aviation Accidents with California leading , then Texas and Florida





Source: travel.trade.gov

Map of the states which have the highest aviation incidences

Conclusions

In conclusion :

There has been a significant decrease in aviation accidents since 1982 which has been encouraging in the aviation sector,

certain states, such as Texas, Florida and California still experience significantly higher accident rates.

The majority of Aviation accident incidents occur during favourable weather. Pilots may grow confident in these weather conditions because they believe there are less risks than in the harsher conditions

Pilots must be well-prepared and aware of the potential risks associated with personal aviation, regardless of the weather conditions and the Make ,there may be underlying challenges with the Engines and the equipment involved

Recommendations:

*__Enhance Safety Protocols Across All Operations:__

Implement safety protocols all through, regardless of flight purpose or location. Provide ongoing training to enhance risk management and decision-making skills for all crew. Foster a proactive safety culture with incident reporting and continuous learning.

* **Invest in Advanced Technology and Infrastructure:**

Upgrade aviation infrastructure, such as airports and runways, to exceed safety standards. Deploy advanced systems for air traffic management, weather monitoring, and decision support to improve situational awareness and operational efficiency. Advocate for regulatory reforms to enforce industry best practices.

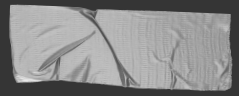
Recommendations(cont):

Conduct Regional Safety Assessments and Planning:

Collaborate closely with local aviation authorities and stakeholders to analyze regional accident data. Develop customized safety plans for high-risk states or regions, focusing on specific risks and effective mitigation strategies. Engage local communities to promote safety initiatives aligned with their priorities.

* **Continuous Improvement and Monitoring:**

Regularly conduct safety audits and assessments to monitor effectiveness and identify areas for enhancement. Integrate insights from incidents, case studies, and industry advancements into ongoing training and operational procedures. Stay updated on emerging technologies, regulatory changes, and best practices to continually elevate safety standards and operational practices.



Thank You !

This project is Available on Github

(GitHub link)

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