

AVIATION SAFETY RISK ANALYSIS PROJECT- NON- TECHNICAL PRESENTATION

Project Overview

This project involves the analysis of aviation accident data from 1962 to 2023 using real-world data from the National Transportation Safety Board (NTSB), to identify the trends and provide insights on the safest aircraft models.

Business Problem

The company is expanding into the aviation industry but lacks knowledge about the potential risks associated with different aircraft models. The goal is to determine and provide actionable insights to the head of the aviation division about the safest, low risk aircrafts for the expansion into the aviation industry to help make informed decisions on aircraft purchases.

Data Understanding

The dataset comes from the National Transportation Safety Board(NTSB) and includes information on aviation accidents from 1962 to 2023.

Data Analysis

The dataset contains multiple columns including: Accident ID, Aircraft Model, Accident Date and Location, Fatalities and Accident Cause. We cleaned the data, handled missing values, and conducted exploratory data analysis on key features such as aircraft model, accident trends over time, accident severity, and flight phase.

Methodology & Process

1. Data Cleaning and Imputation: We removed irrelevant columns, handled missing values and corrected improper data structures.
2. Data Analysis: Identified accident trends, risk distribution by aircraft model, and severity by flight phase.

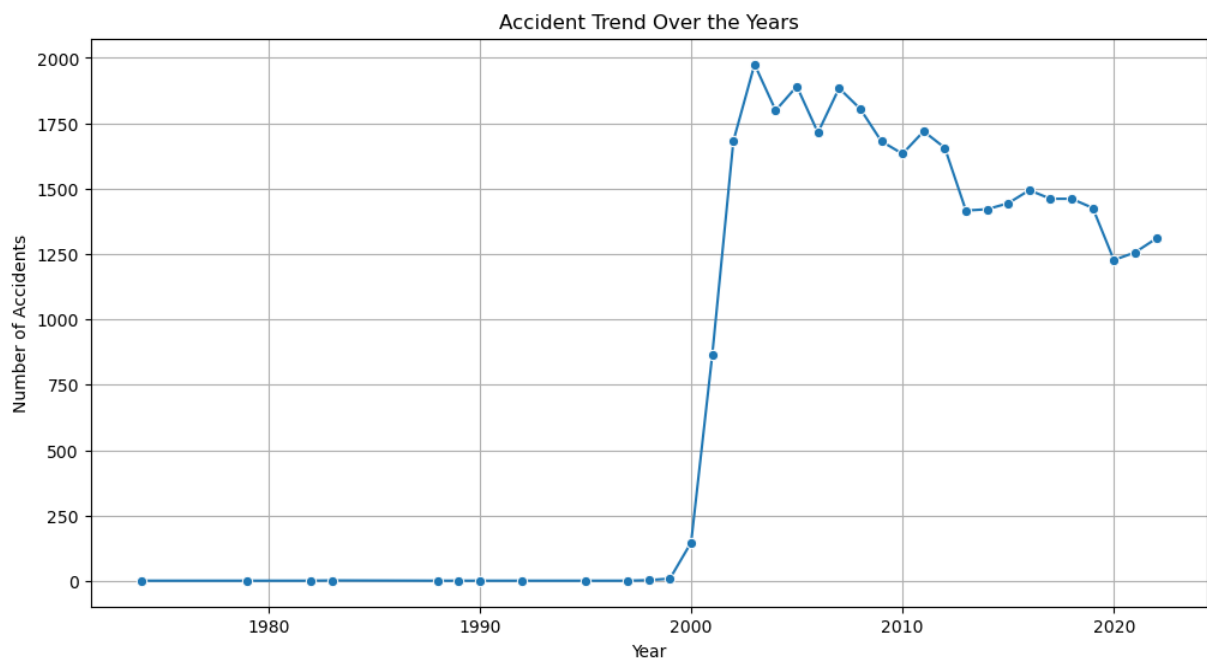
3. Visualization:

Created an interactive dashboard using Tableau:
Accident Trends by Aircraft Model -Top 20 Aircraft
Models Involved in Accidents (1999–2022), Accident
Trends Over Time -Trend Analysis of Aircraft Accidents by
Make/Model, Risk Distribution by Aircraft Make/Model
and Severity and Proportion of Fatalities by Phase Flight

<https://public.tableau.com/app/profile/allan.ofula/viz/AVIATIONSAFETYRISKANALYSISVISUALIZATION/Dashboard1?publish=yes>

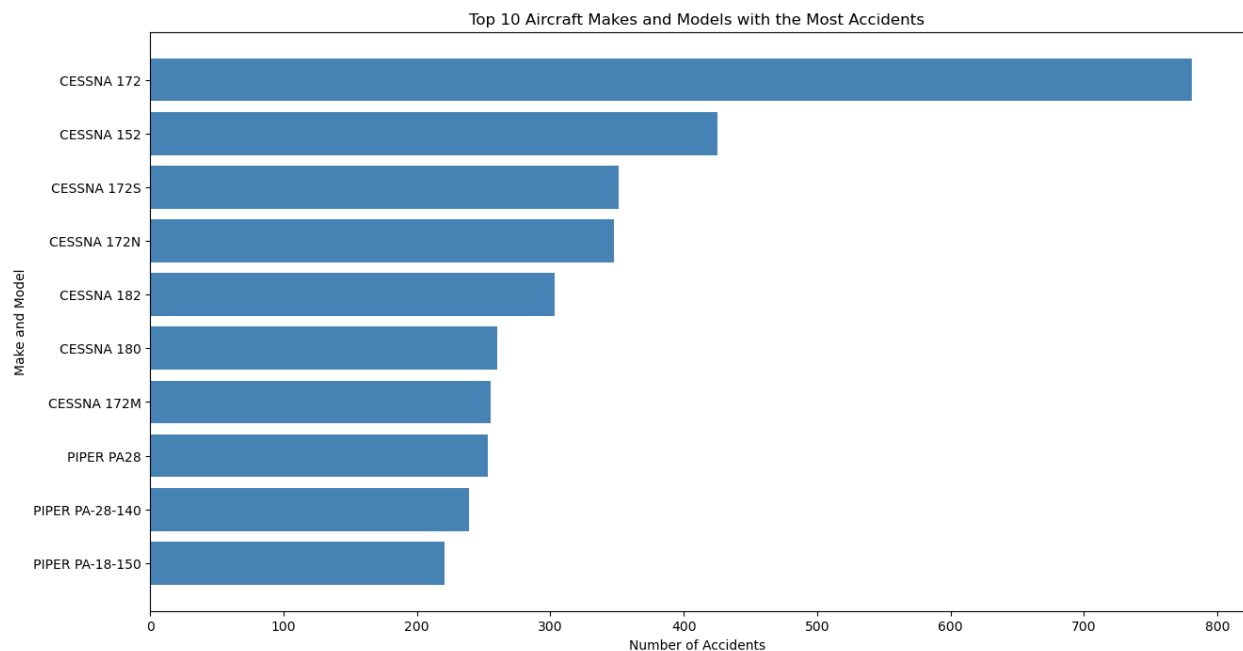
Key Insights on the Visualizations

1. Accident Trends Over Time: Decline in accidents in recent years.

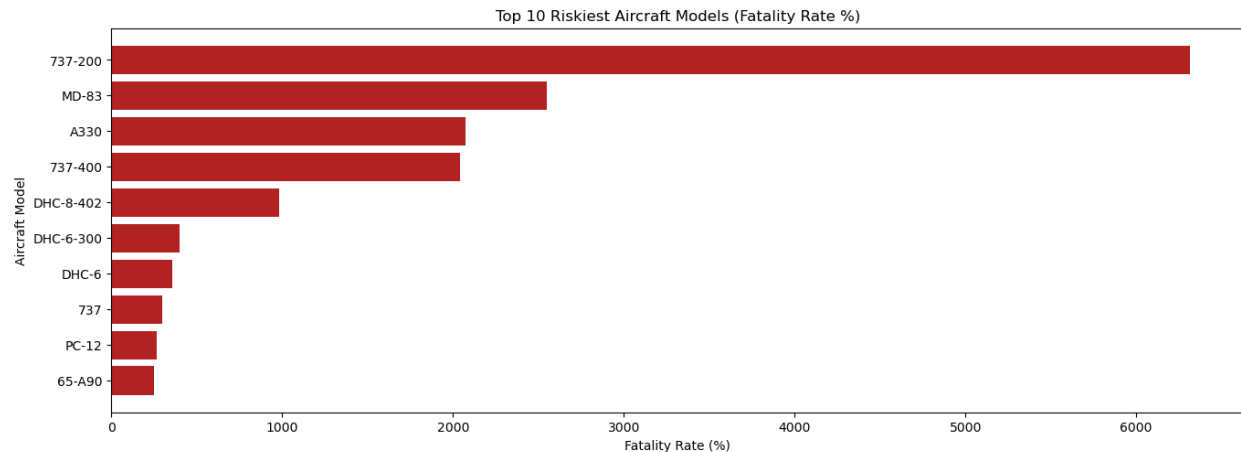


The accident trend from 1974 to 2022 reveals a significant increase in reported incidents between 2000 and 2003, with 2003 recording the highest number of accidents. After 2003, the number of accidents stabilized at a high level before gradually declining from 2014 onwards.

2. Accidents by Aircraft Model: Certain models show significantly higher accident rates.

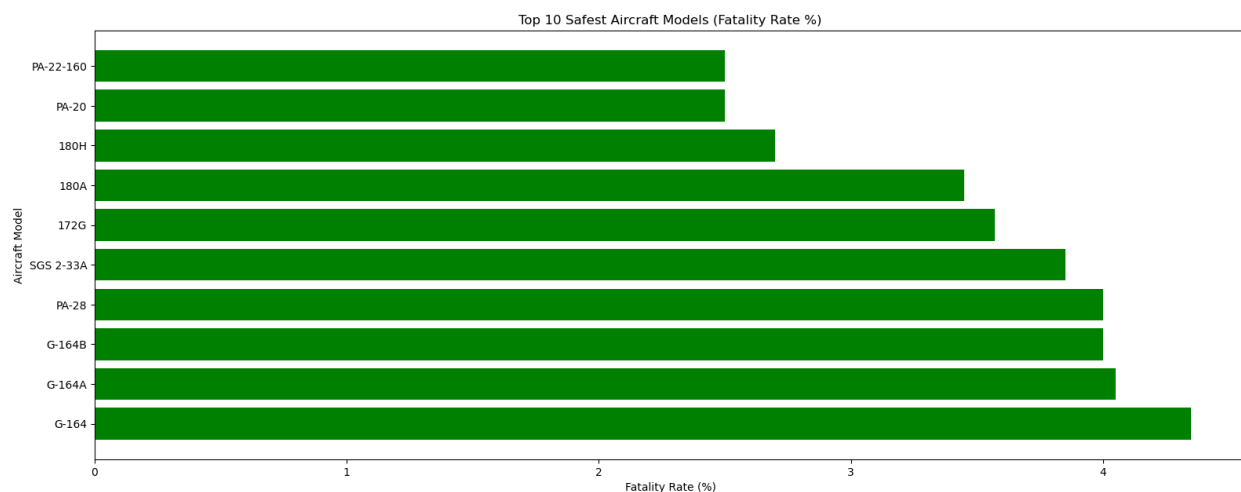


CESSNA series dominates the list with most accidents, followed by PIPER and BEECH.



The 737-200, MD-83, A330 and 737-400 have extremely high fatality rates, making them highly risky.

Safest-Low risk models

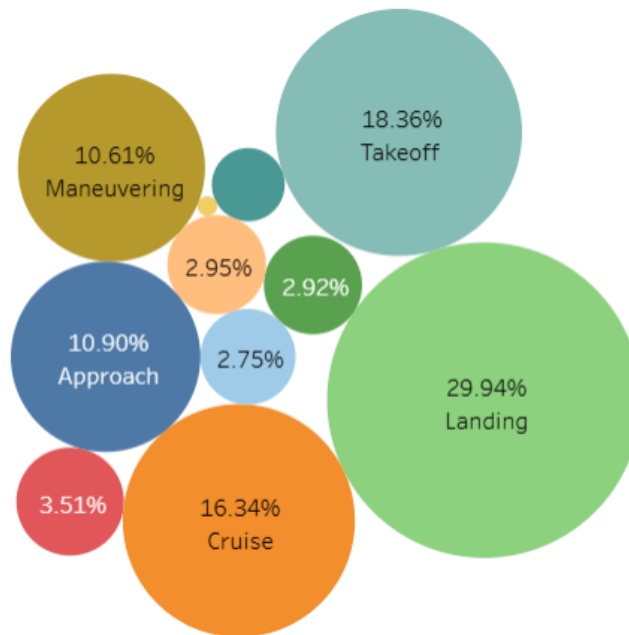


Models like PA-22-160, PA-20 and 180H have remarkably low fatality rates, suggesting they are much safer options.

3. Accident Severity by Flight Phase

Most severe accidents occur during takeoff and landing.

Proportion of Fatalities by Phase Flight



Landing and takeoff phases have the highest number of accidents, accounting for almost half of all incidents, suggesting that the critical phases at the beginning and end of a flight are the most vulnerable. Cruise phase, maneuvering and approach phase accidents are less frequent but could be catastrophic due to the typical high altitude and speed.

Recommendations

1. **Avoid High-Risk Models:** Avoid aircraft models with historically high fatality rates like 37-200, MD-83, A330 and 737-400.
2. **Invest in Proven Safe Aircraft:** For a balanced fleet, invest in models like PA-22-160, PA-20, 180H, 172G and similar models, which offer reliability and lower operational risks for both private and commercial use.
3. **Avoid expanding operations in high-risk regions** without enhanced pilot training and safety protocols specific to those environments.
4. **Regular Maintenance and Safety Checks:** Ensure that maintenance schedules are strictly followed, as older models are more prone to mechanical failures, increasing accident risk.
5. **Training and Safety Protocols:** Implement comprehensive training programs for pilots and operational staff to reduce human errors, a significant contributor to accidents

Next Steps

1. Conduct a detailed risk assessment on selected aircraft models.
2. Negotiate with manufacturers for safety feature upgrades.
3. Monitor safety trends regularly for proactive risk management.
4. Hire qualified personnel, Implement comprehensive training programs for pilots and operational staff
5. Strict regulations internal policies

Thank you for your attention!

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