AIRCRAFT SAFETY ANALYSIS FOR BUSINESS EXPANSION

Prepared by:
Petronilla Moraa Nyadwaro

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KEY

PROBLEM STATEMENT

OBJECTIVES

DATA ANALYSIS

KEY INSIGHTS

Q & A
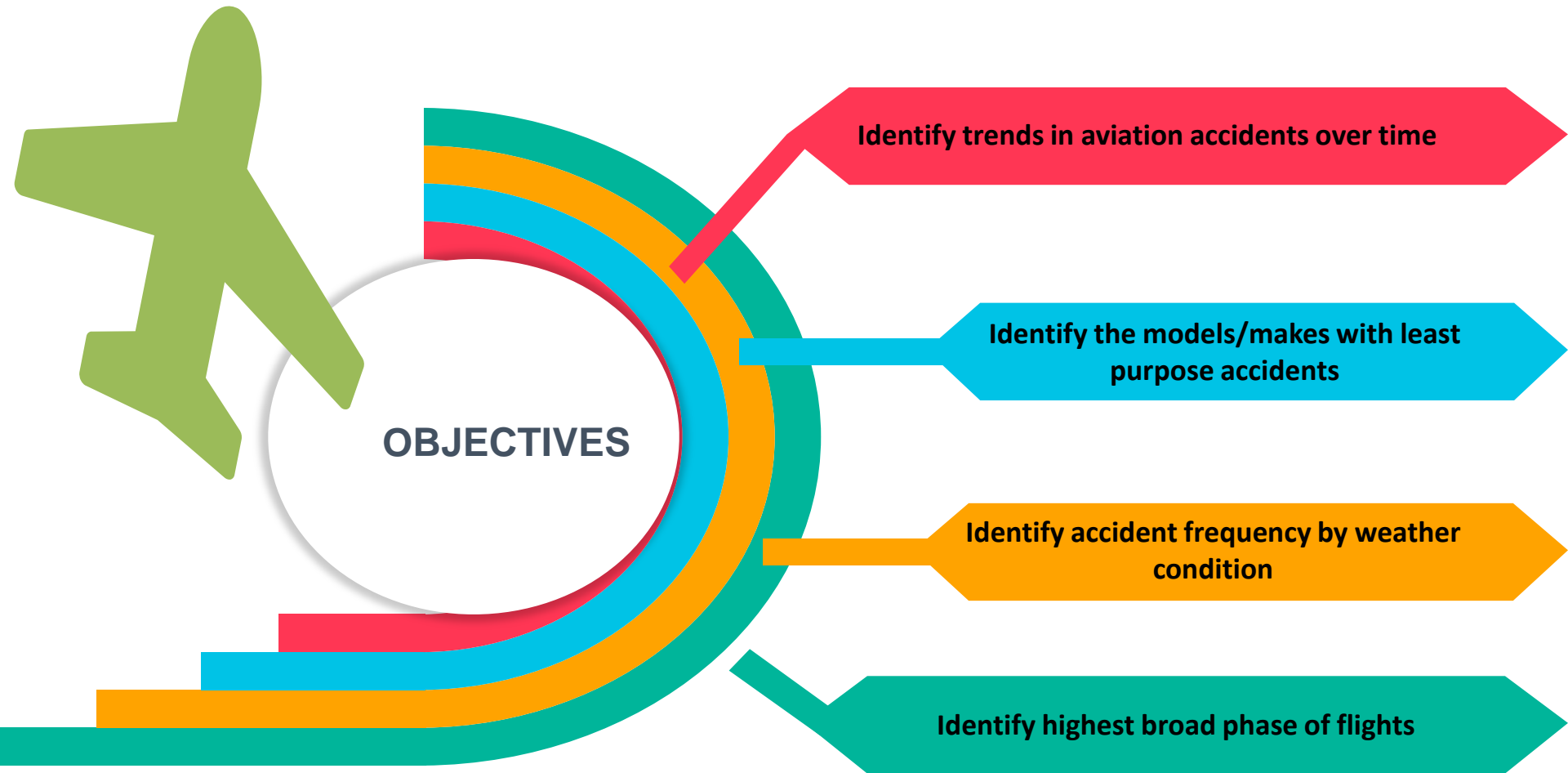
CONCLUSION

STRATEGIC PLAN

RECOMMENDATIONS

PROBLEM STATEMENT

- The company would like to expand its portfolio in aviation industry.

- The goal is to minimize operational risks and ensure profitability

- *Key question is: Which aircraft models are safest and most reliable for purchase?*
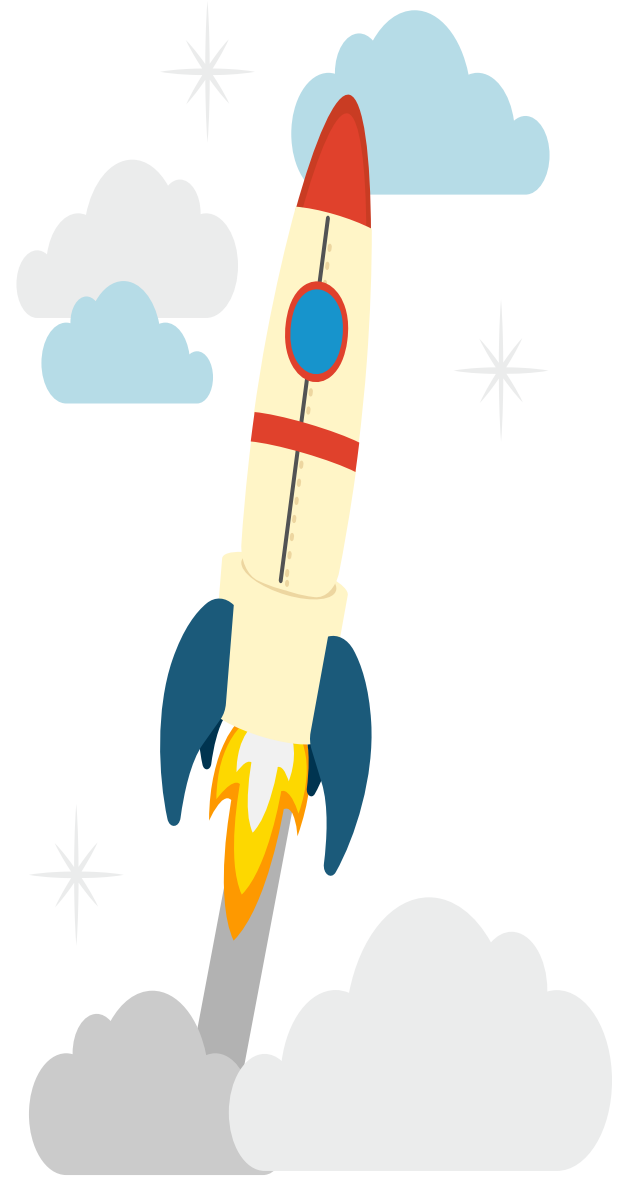
Expand to commercial and private enterprises while minimizing operational risks and maximizing profitability.

OBJECTIVES

Identify trends in aviation accidents over time

Identify the models/makes with least purpose accidents

Identify accident frequency by weather condition

Identify highest broad phase of flights

Data Sources and Approach

Data source

The National Transportation Safety Board. The data includes aviation accident data from 1962 to 2023 about civil aviation accidents and selected incidents in the United States and international waters

Analysis Method

Data cleaning

Data understanding

Data analysis

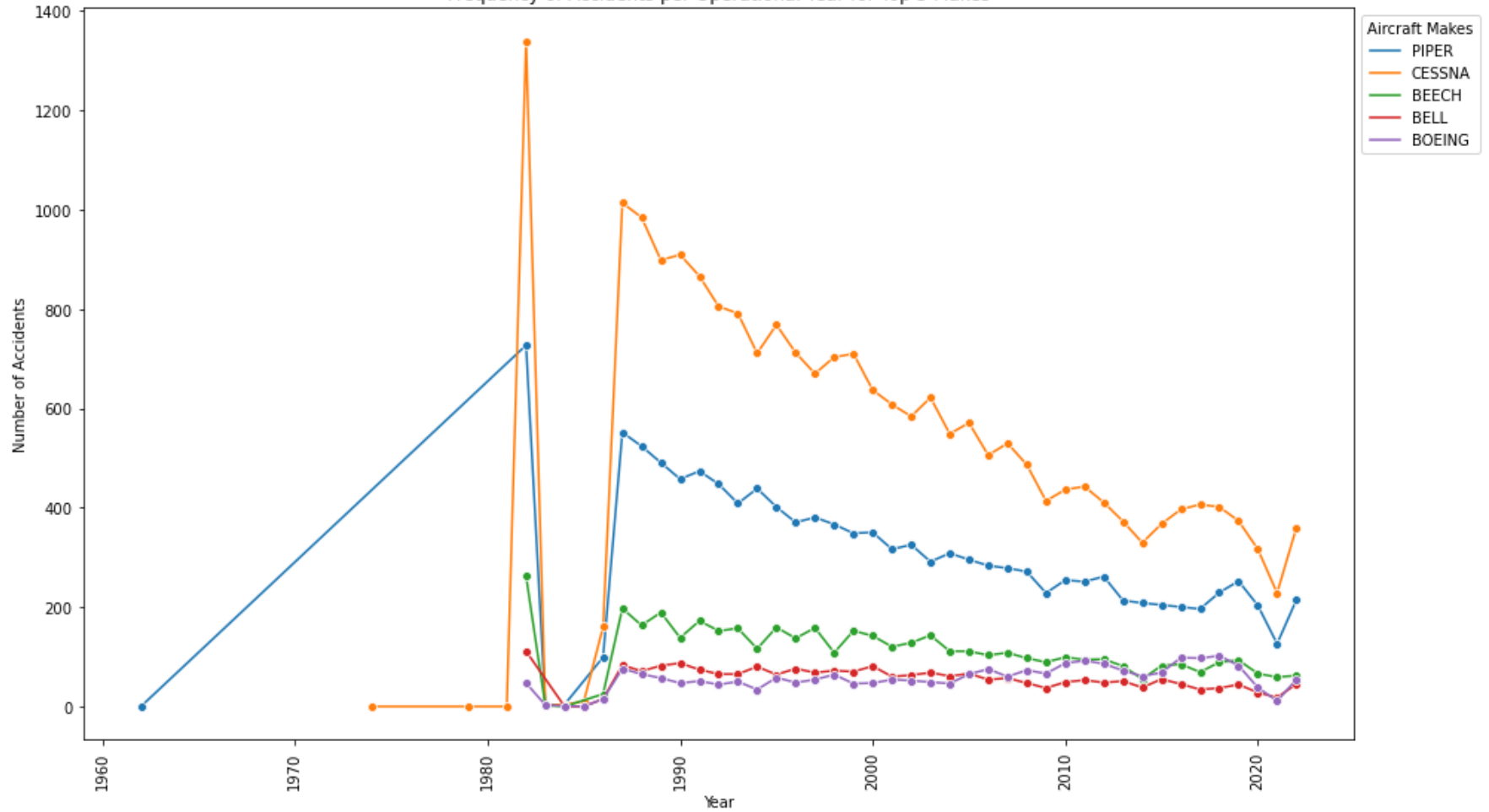Visualization

Trend analysis

Risk profiling

Visualization

Correlation heat map

Bar graph on airplane model against fatalities

Box plot on fatalities against models

Histogram on board of flight against accidents

Line graphs per operational year
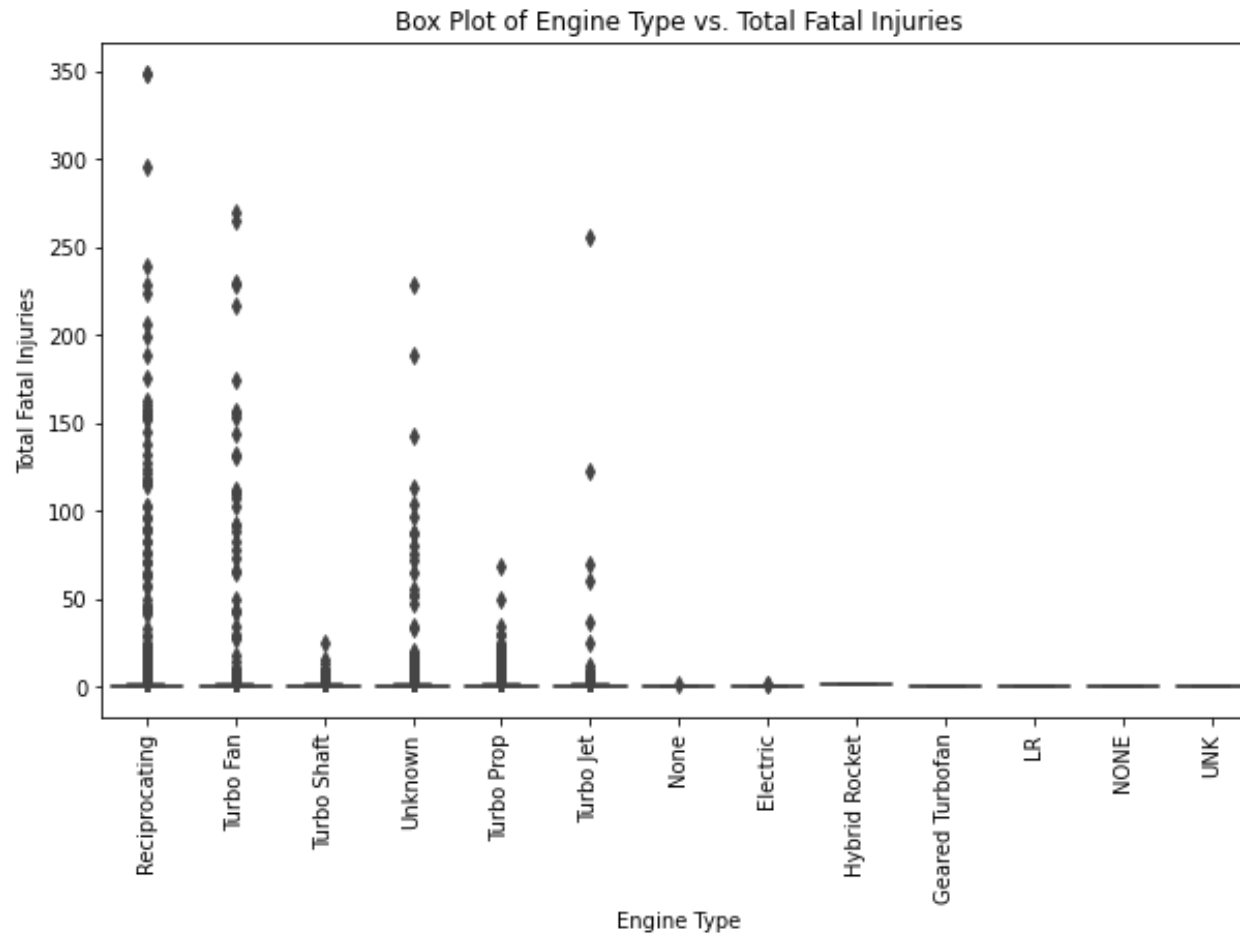
Accident Trends by Year

Frequency of Accidents per Operational Year for Top 5 Makes
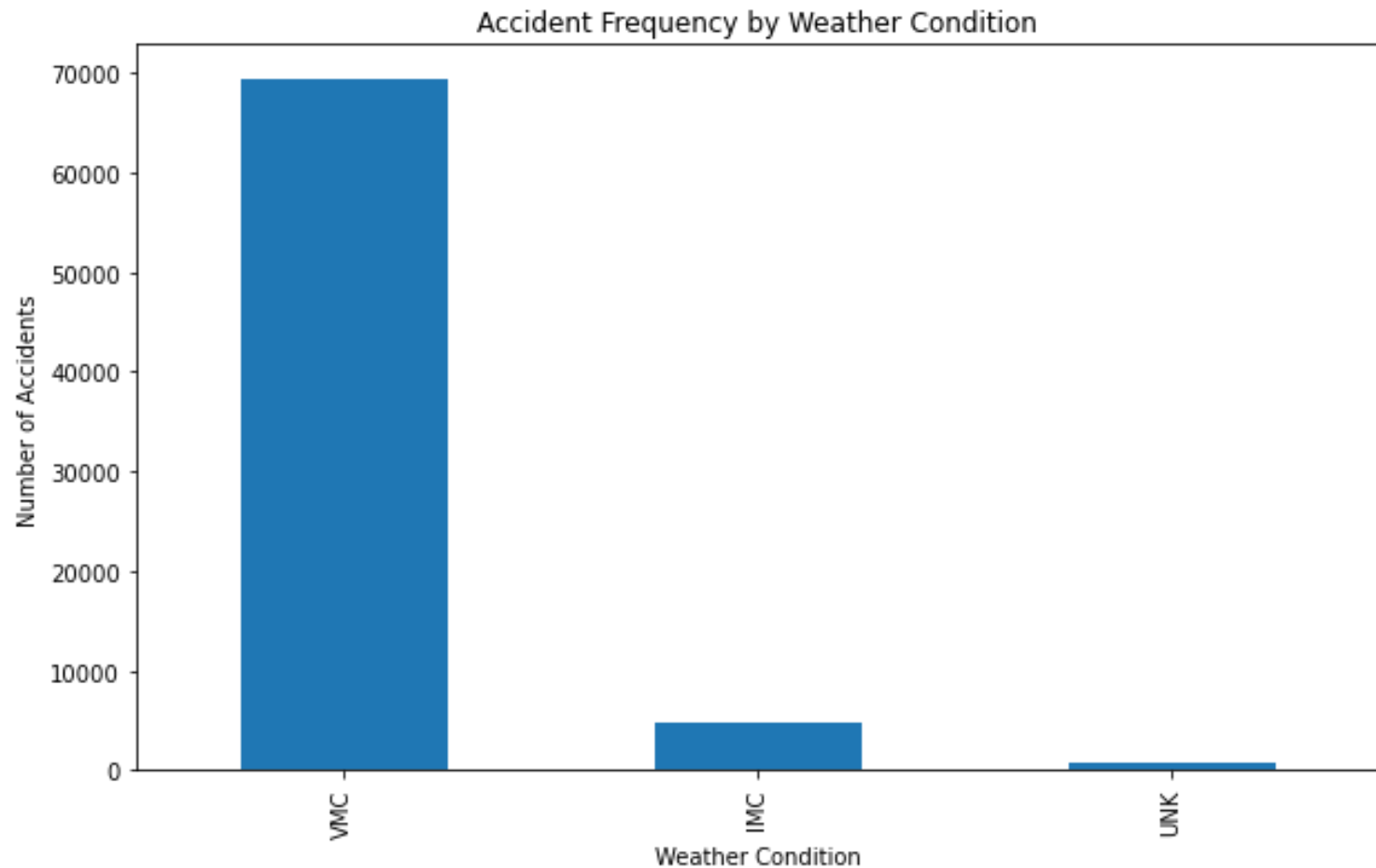
Risk Assessment by Aircraft Model

Top 30 Model with Highest Accident Count
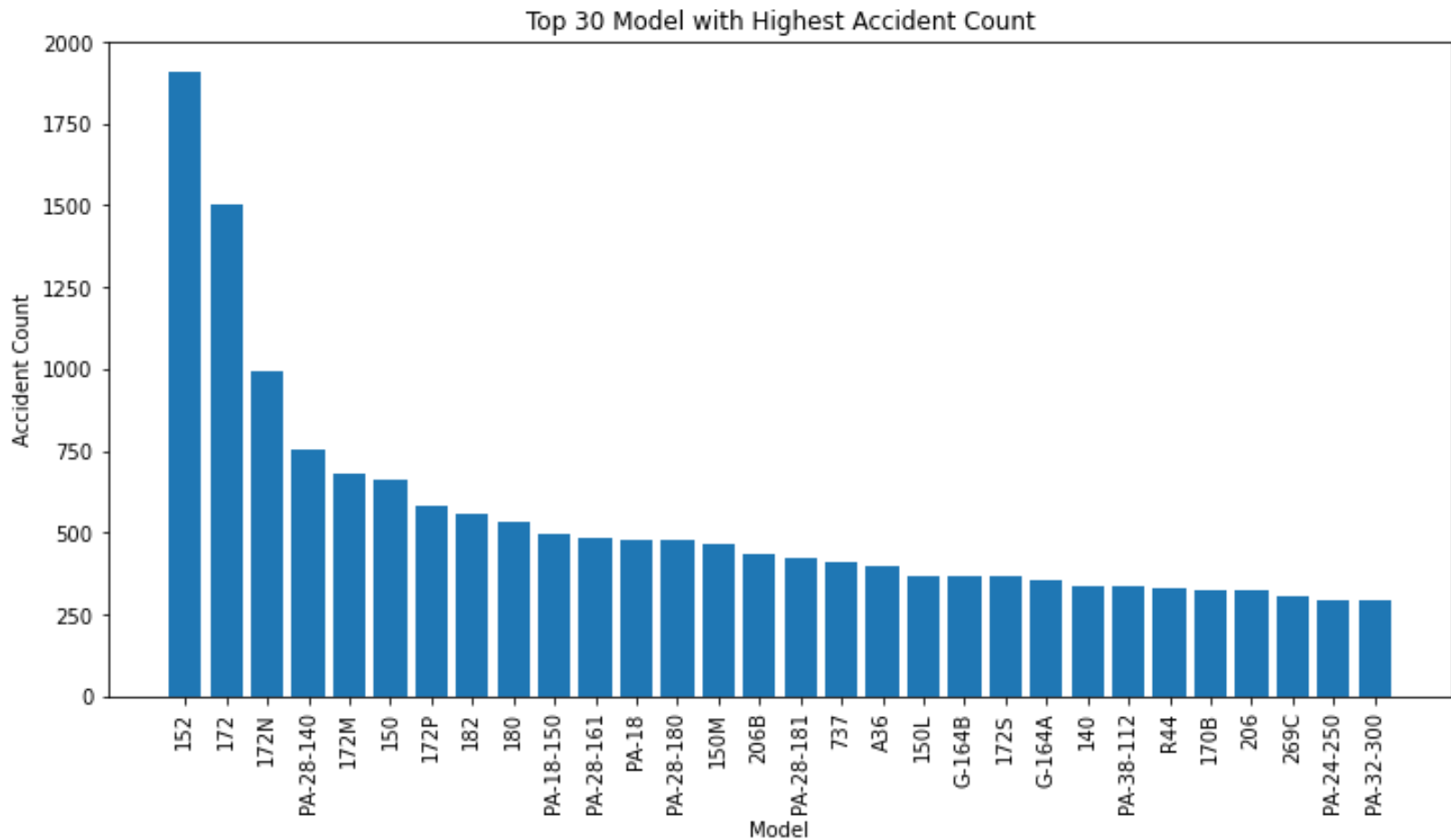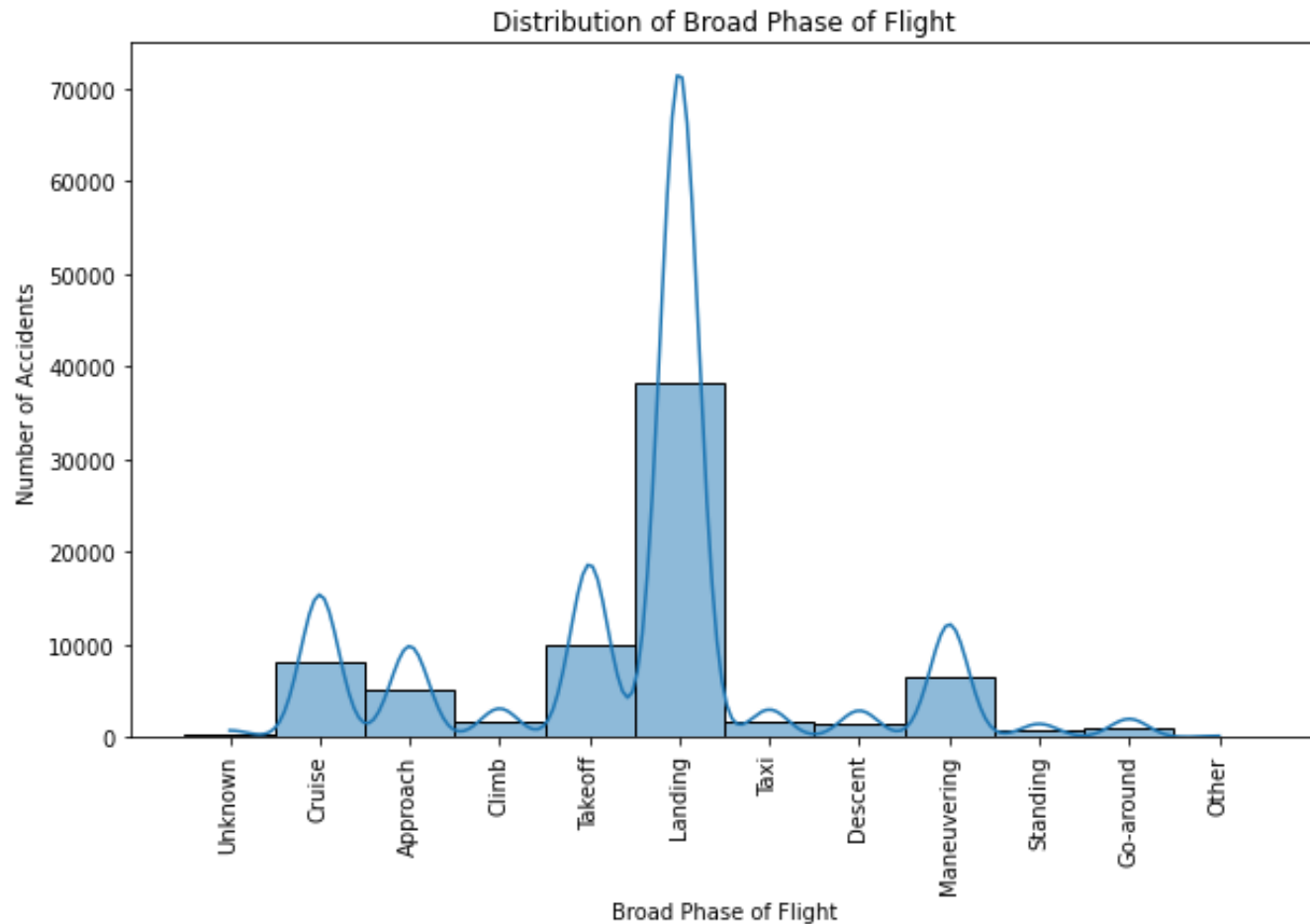
Injury Severity by Engine Type

Box Plot of Engine Type vs. Total Fatal Injuries

Impact of Weather Conditions

Accident Frequency by Weather Condition

Histogram on board of flight against accidents

Recommended Aircraft for Purchase

Least 20 Total Fatal Injuries by Model
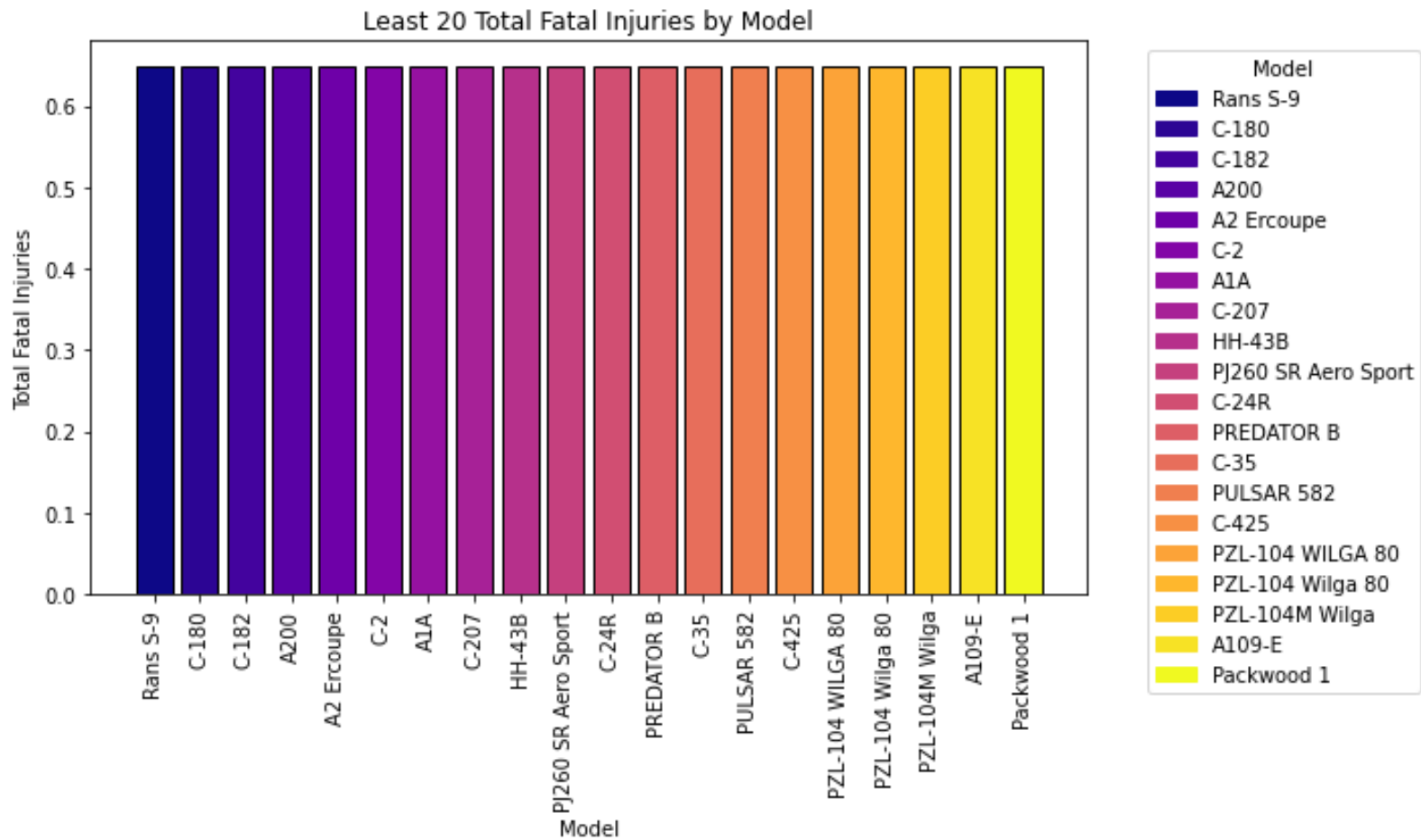
Proposed Safety and Operational Strategy

Invest in safety measures for landing/take-off phases

engines with reciprocating, turbo fan, and turbo shaft technologies are associated with higher rates of fatal injuries, likely due to their complexity and operational demands. On the other hand, geared turbofan, hybrid, and electric engines tend to have lower fatal injury rates, possibly due to their more advanced safety features and design improvements.

02

Focus on models with low fatality rates

01

The analysis reveals that Cessna, Piper, Beech, and Boeing have the highest accident counts, with models like the 152, 172, PA-28-140, and 172M contributing significantly. In contrast, RANS S-9, C-180, A200, and A2 Ercoupe models show the lowest fatal injuries, making them safer options.
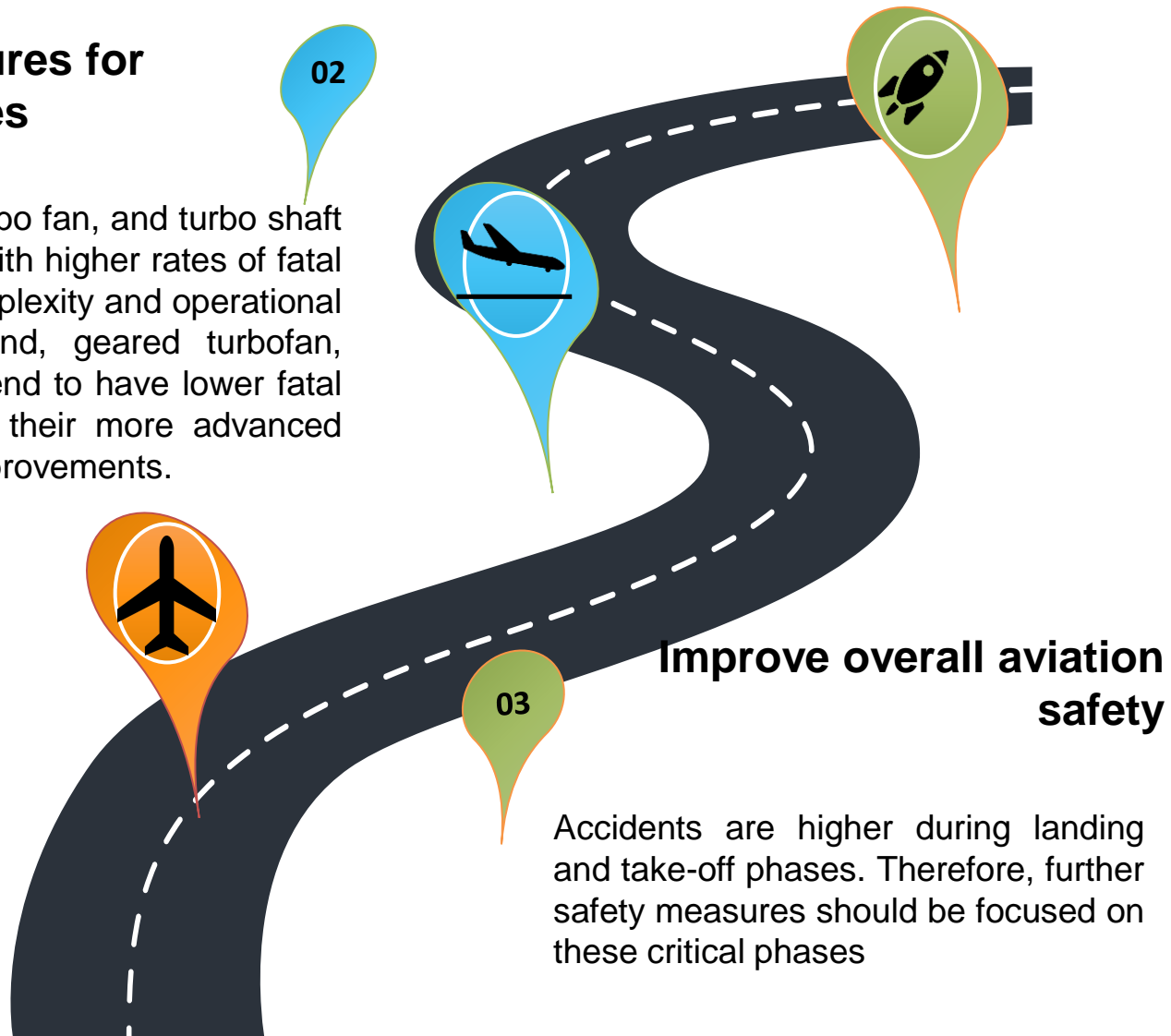
Improve overall aviation safety

03

Accidents are higher during landing and take-off phases. Therefore, further safety measures should be focused on these critical phases

Conclusion

RECOMMENDATIONS

We recommend the company to take model and make e.g. Jerald f, Huffmann, RANS S-9, C-180, A200, and A2 Ercoupe models, and geared turbofan, hybrid, and electric engines which are likely to reduce the risk of accidents and ensure efficiency.

To minimize risks and maximize profitability, the organization should focus on aircraft used for PUBL, PUBS, ASHO, and air drop operations, as these have lower accident rates. On the other hand, personal, instructional, and aerial application flights, which tend to have higher accident frequencies, require extra attention in terms of safety measures.

Assessment by broad phase

Accidents is higher during landing and take-off phases

Plane make assessment

Fatalities are most associated with makes like Boeing, Tupolev, Douglas, and Airbus Industries

Engine type assessment

Engines with reciprocating, turbo fan, and turbo shaft technologies are associated with higher rates of fatal injuries, likely due to their complexity and operational demands

Plane model assessment

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