

Aircraft  
**INCIDENT**  
**ANALYSIS**  
**AND**

RECOMMENDATIONS

A Data-Driven Approach to  
Safer Fleet Management



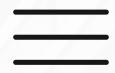


# INTRODUCTION



## Project Overview

- This project focuses on analyzing aircraft incidents across various models, engine types, weather conditions, and construction types (amateur vs. professional).
- The objective is to provide data-driven recommendations to improve fleet safety, operational decisions, and risk management.



# WHICH AIRCRAFT MODELS SHOULD BE AVOIDED BASED ON SAFETY RECORDS?

## Models to Avoid

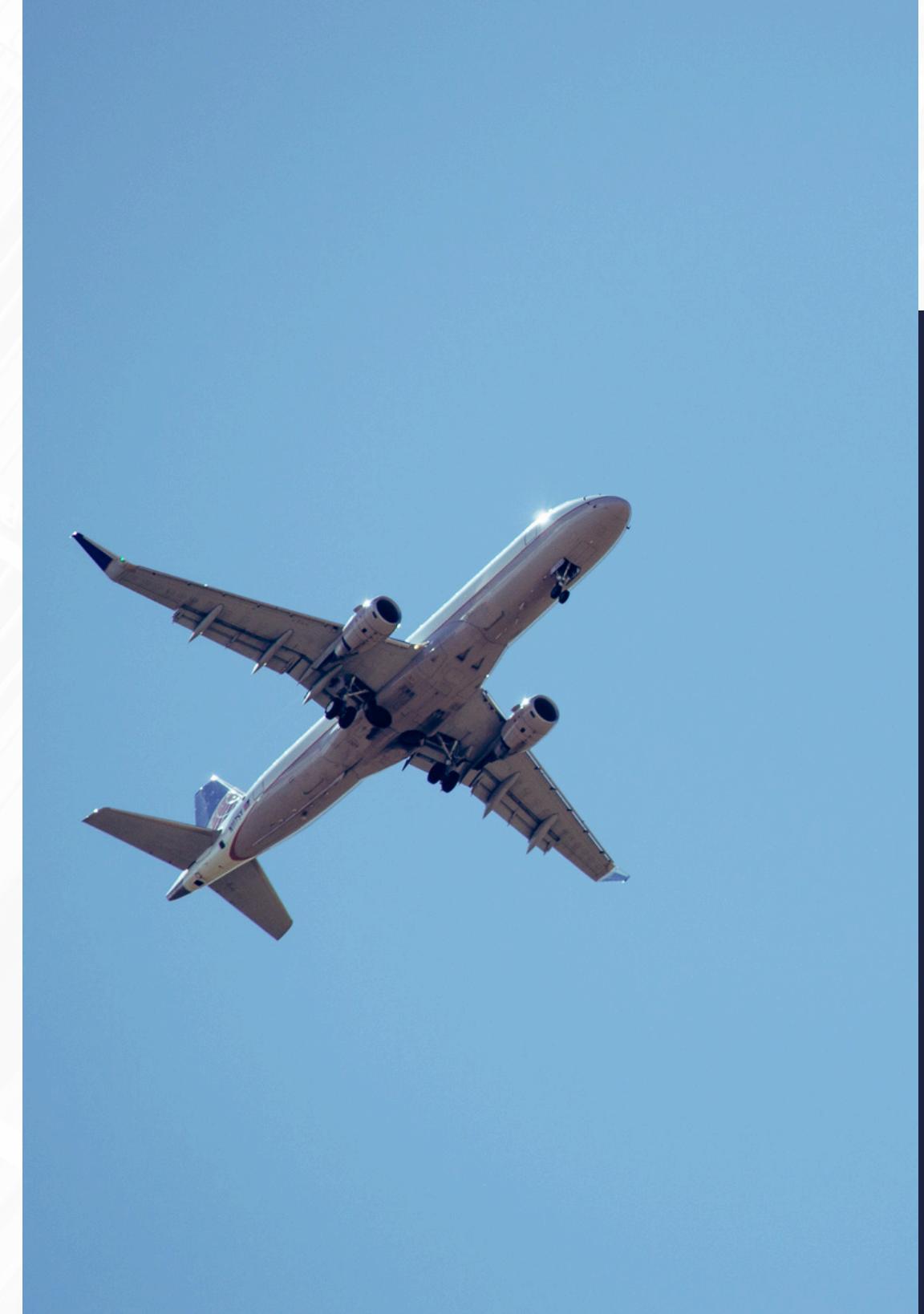
- Cessna 152, Cessna 172, and Boeing 737 have the highest number of incidents and fatal outcomes across multiple countries.
- These models are frequently involved in accidents, suggesting the need for caution when selecting them for fleet operations.
- Recommendation: Conduct a detailed risk assessment before acquiring these models and evaluate other options with better safety records.



## **WHICH AIRCRAFT MODELS ARE RECOMMENDED FOR PURCHASE BASED ON LOWER FATALITY RATES?**

### **Recommended Models**

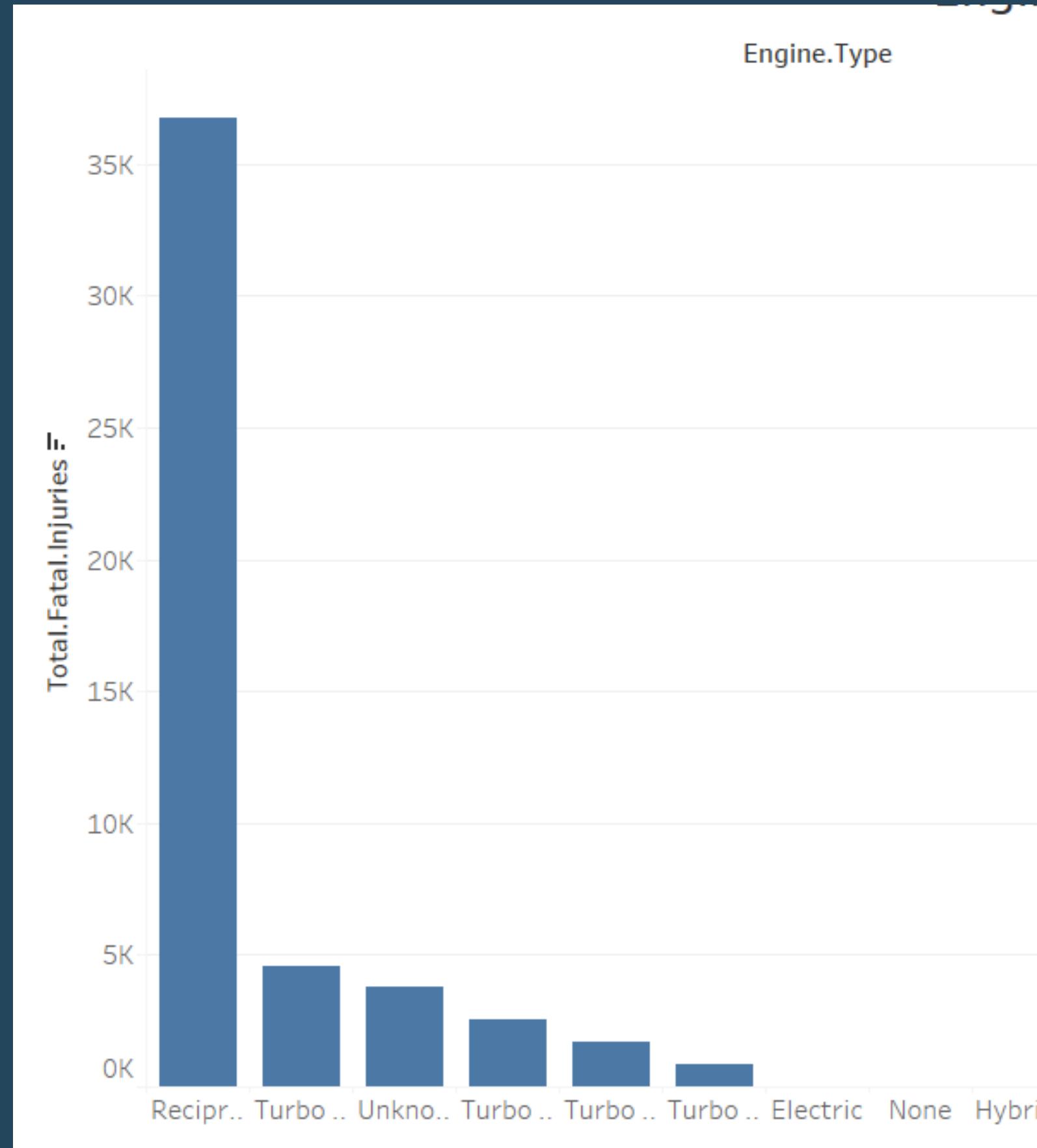
- Cessna C208B and Cessna C207 models have lower fatality rates and fewer incidents.
- These models offer a reliable and safer option for fleet operations, particularly for high-frequency use.
- Recommendation: Prioritize these models for acquisition due to their proven safety records.



# Safer ENGINE TYPES

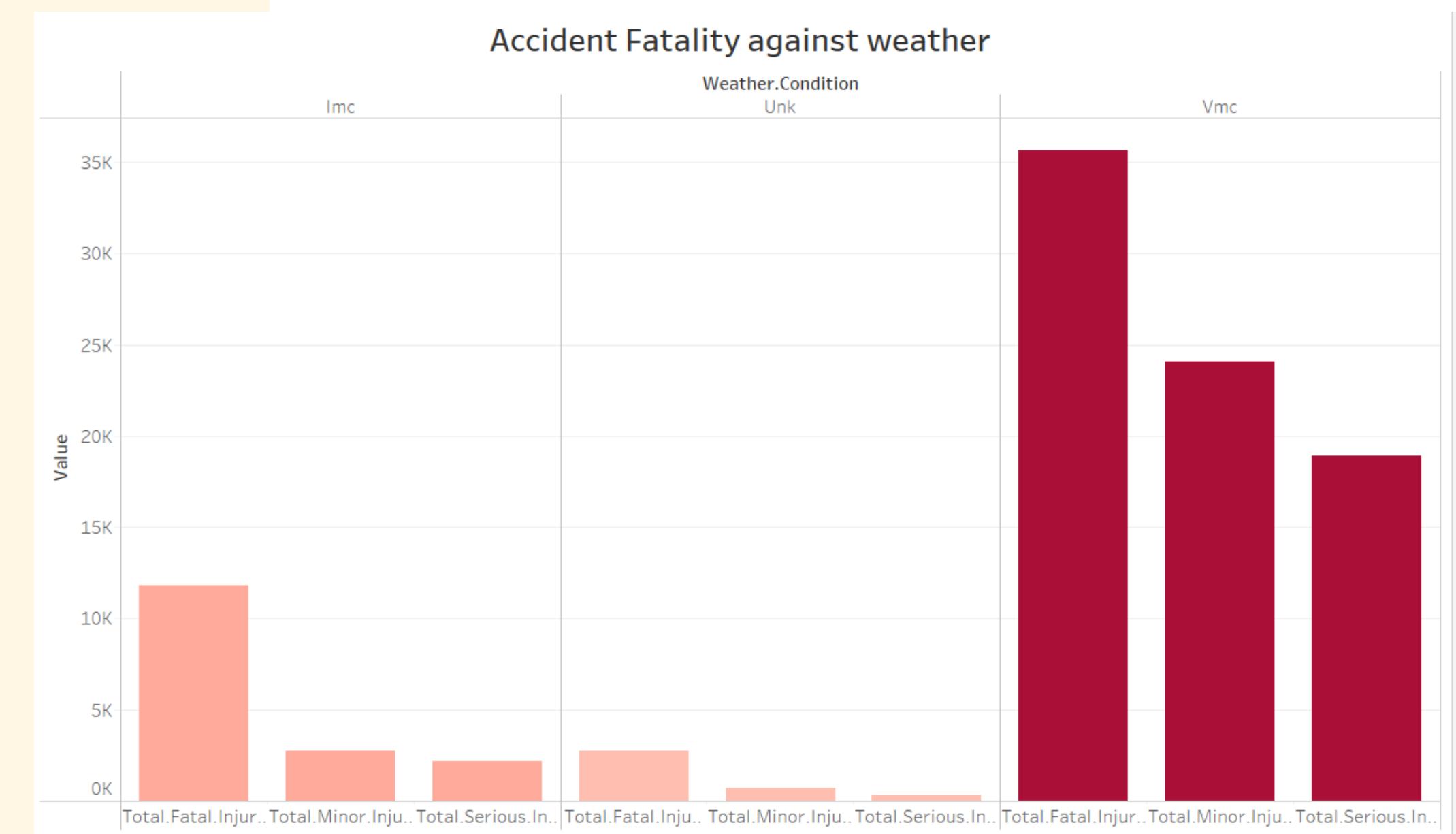
Which engine types are the safest in terms of fatality rates?

- Turbo Prop and Turbo Shaft engines show lower fatality rates compared to Reciprocating engines.
- Reciprocating engines have the highest number of fatal incidents but are the most commonly used.
- Recommendation: Prioritize Turbo Prop and Turbo Shaft engines for commercial and high-risk operations. Limit the use of reciprocating engines unless additional safety measures are in place.



## MANAGING WEATHER RISKS

- Incidents in Instrument Meteorological Conditions (IMC) have higher fatality rates compared to Visual Meteorological Conditions (VMC).
- Recommendation: Invest in advanced avionics like Enhanced Ground Proximity Warning Systems (EGPWS) and Terrain Awareness Warning Systems (TAWS) for safer navigation in poor weather.
- Train pilots for challenging weather scenarios and enforce stricter flight delay protocols during adverse weather conditions.



# What are the risks associated with amateur-built aircraft, and should they be used?



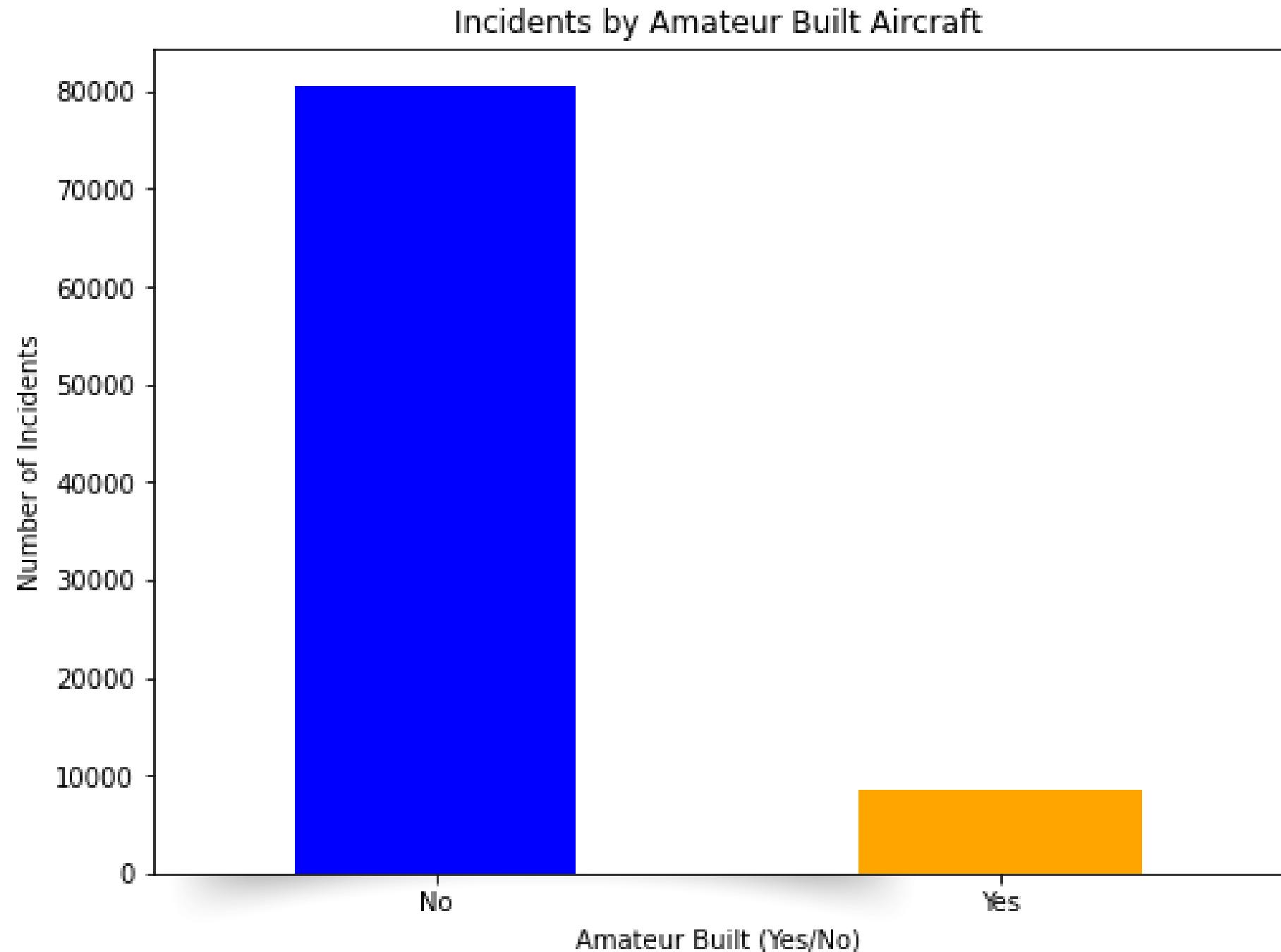
Amateur-built aircraft have a higher fatality rate (8.29%) compared to professionally-built aircraft (5.67%).



They are involved in fewer incidents overall, but when accidents occur, they are often more severe.



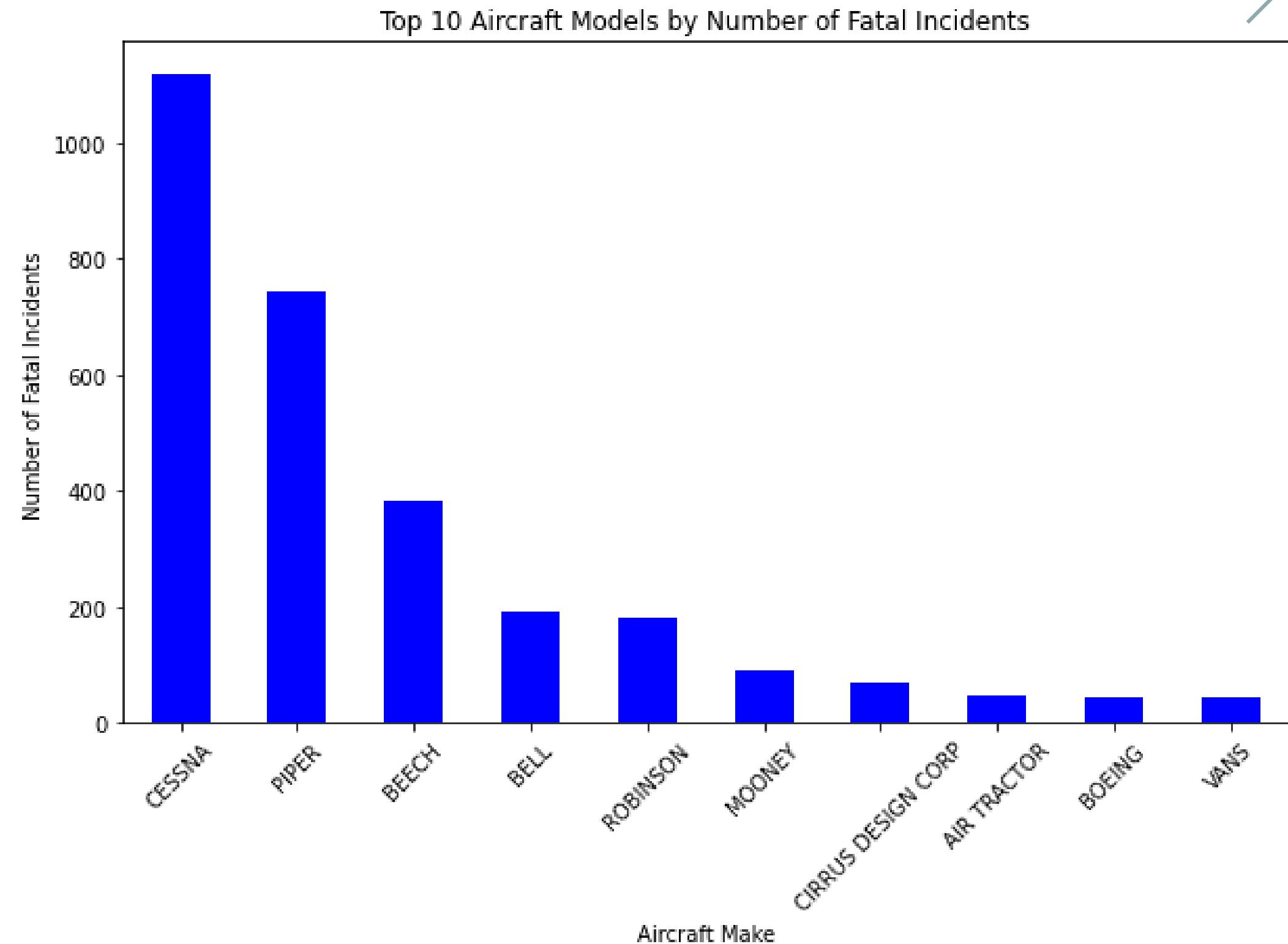
Limit the use of amateur-built aircraft for commercial operations and prioritize professional models for safety and reliability.



# HOW DO REGIONAL TRENDS IN AIRCRAFT INCIDENTS INFLUENCE FLEET DECISIONS?

## Regional Aircraft Incident Trends

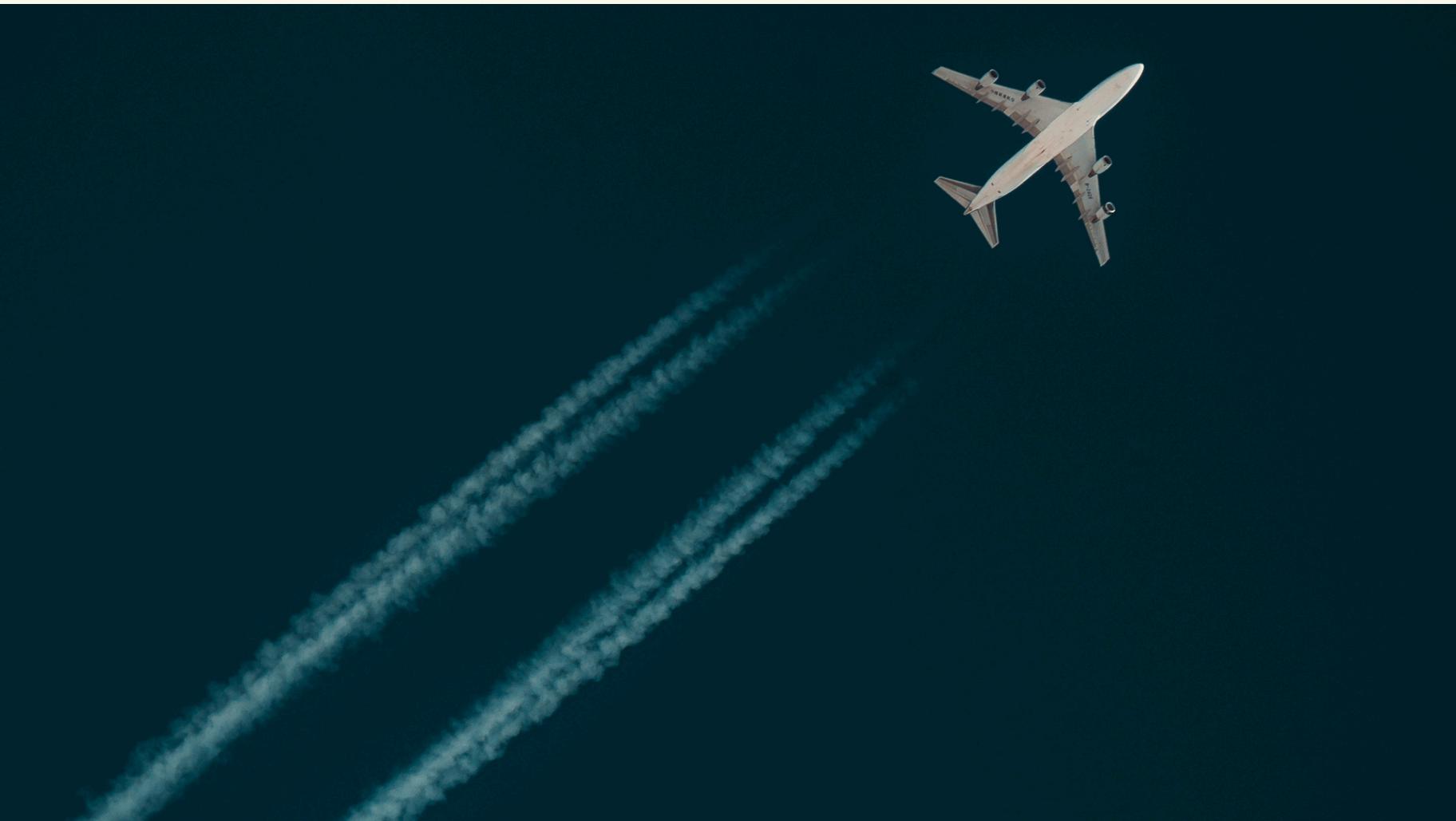
- The United States, Brazil, and Canada show high incident counts for certain models like Cessna 152, Piper PA-28, and Boeing 737.
- Recommendation: Tailor fleet decisions based on regional safety trends and the performance of aircraft models in specific operating environments. Avoid models that have a poor safety track record in your target region.



# Predictive Maintenance

## How can predictive maintenance schedules reduce incident risks?

- By analyzing incident trends over time, maintenance schedules can be adapted to prevent mechanical failures and mitigate risks.
- Recommendation: Implement predictive maintenance schedules, particularly for older aircraft or models with higher incident counts. Anticipating periods of higher risk can reduce the chance of accidents.



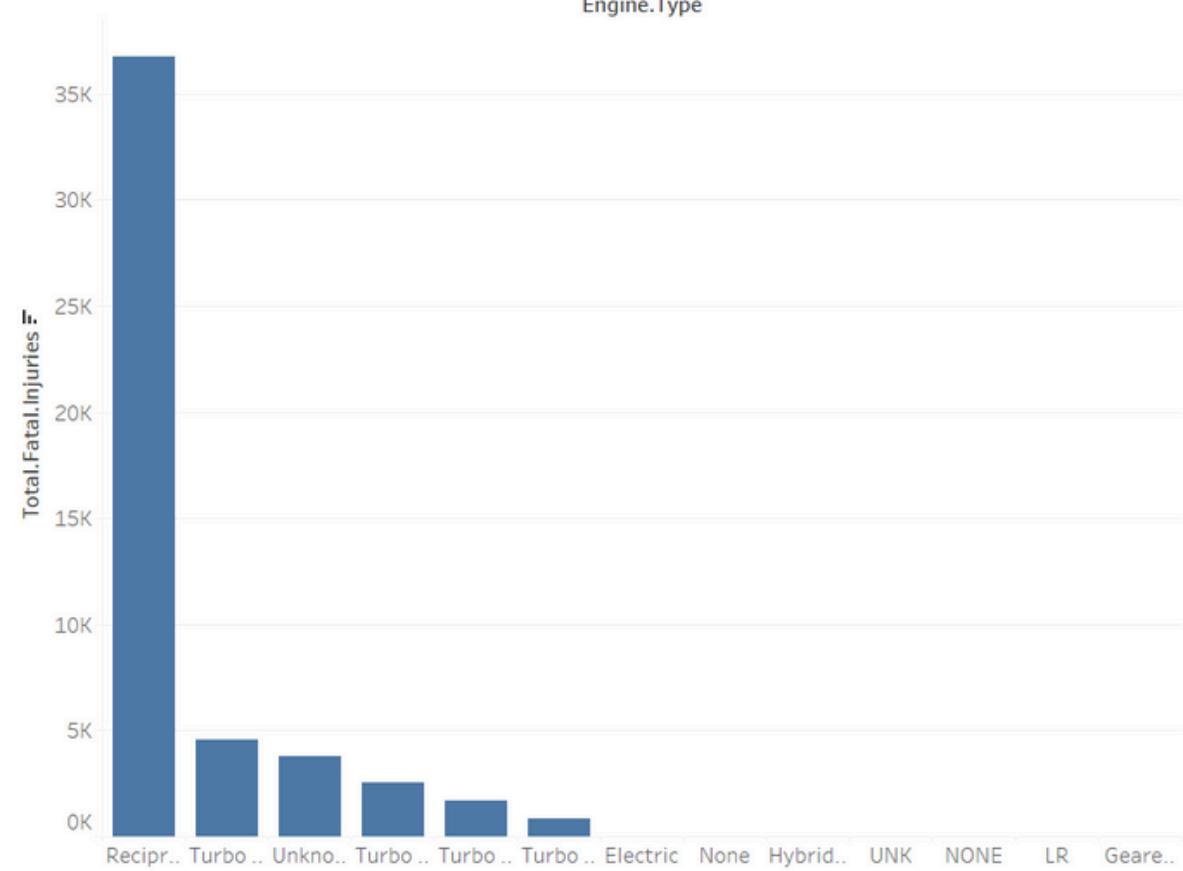
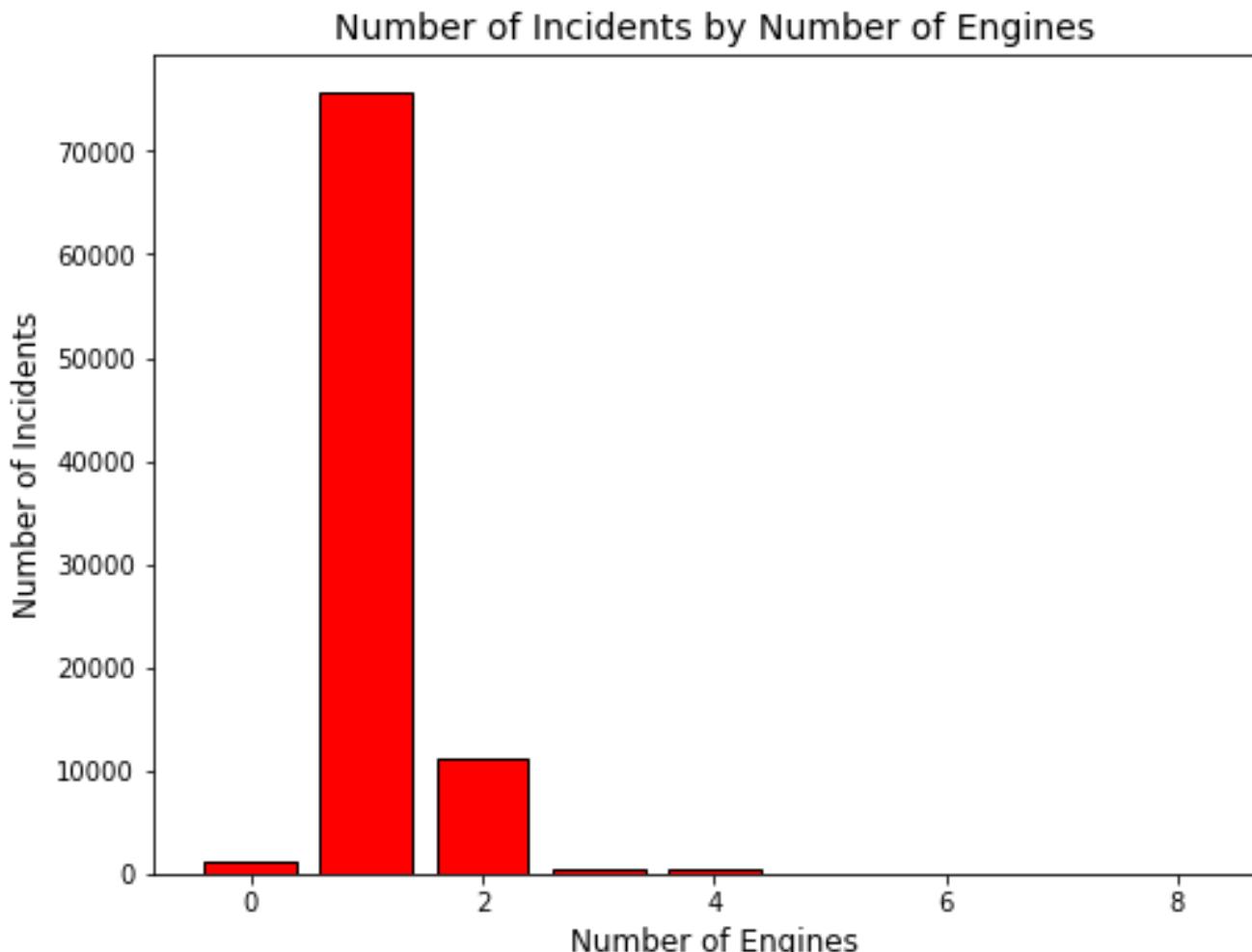
# HOW DOES WEATHER AFFECT AIRCRAFT SAFETY, AND WHAT CAN BE DONE TO MITIGATE THIS?

- Weather plays a crucial role in incident severity, especially under IMC conditions.
- Recommendation: Enhance pilot training for adverse weather conditions, upgrade fleet avionics for better navigation, and adopt strict flight delay protocols during poor weather to mitigate risks.



# What steps should be taken to reduce the risks associated with certain models and engines?

- Prioritize planes with more engines
- Regular Maintenance: Prioritize maintenance and safety upgrades for older or incident-prone models.
- Pilot Training: Provide additional training for models frequently involved in incidents.
- Upgrade Fleet: Retire or upgrade older aircraft models and replace high-risk engine types with safer alternatives.
- Diversify Fleet: Avoid relying too heavily on one model or engine type to reduce operational risks.



**THANK  
YOU**

