

Presented by:  
James Maurice Owiti

# AVIATION ACCIDENT ANALYSIS & RISK ASSESSMENT

Understanding Patterns, Fatalities, and Risk Factors

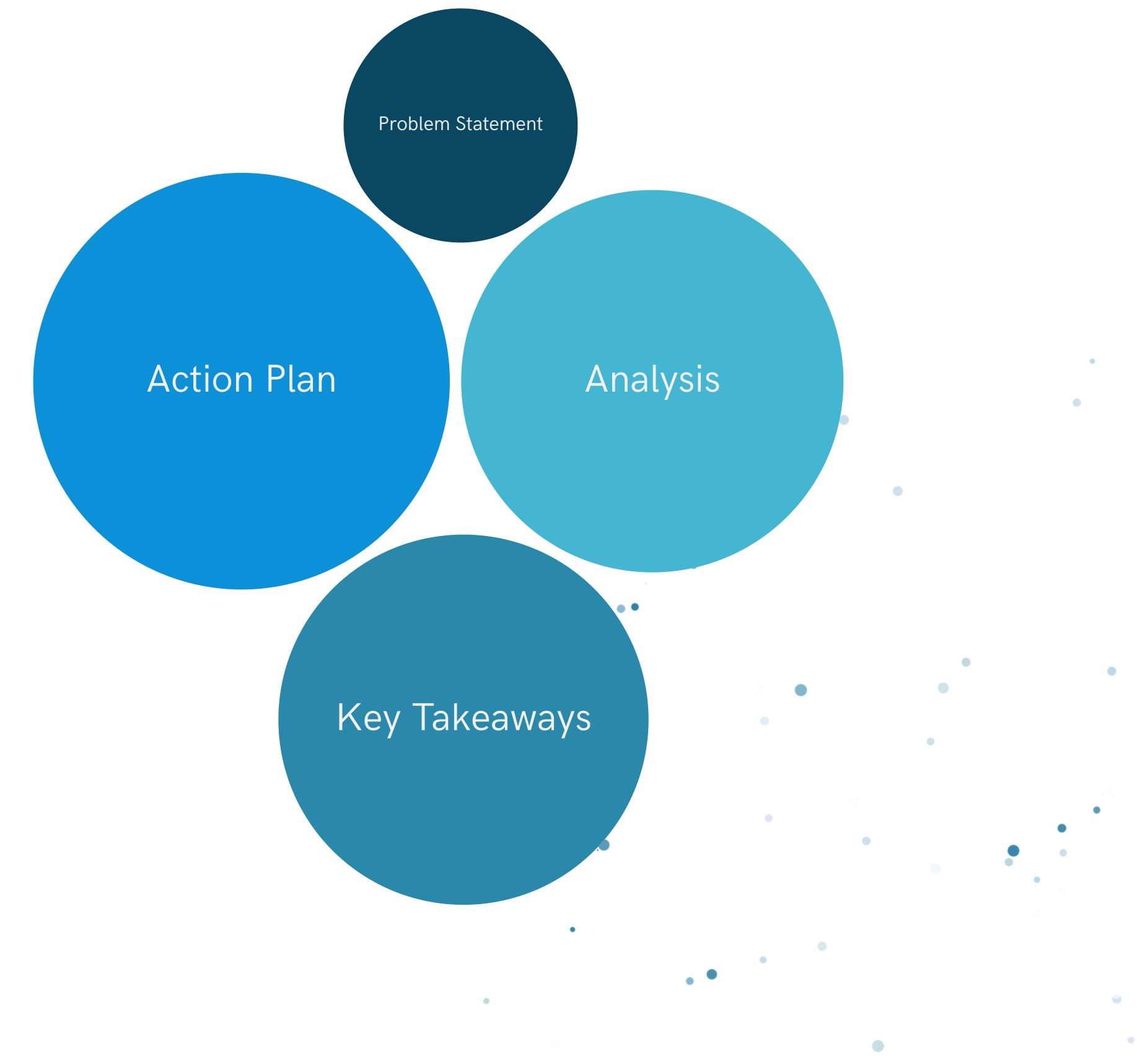


# INTRODUCTION

GOAL: Analyze aviation accident data to identify risk factors

Focus: Fatality rates, accident frequency, aircraft types, flight purposes

Benefit: Inform safety interventions and regulation



# BUSINESS STATEMENT

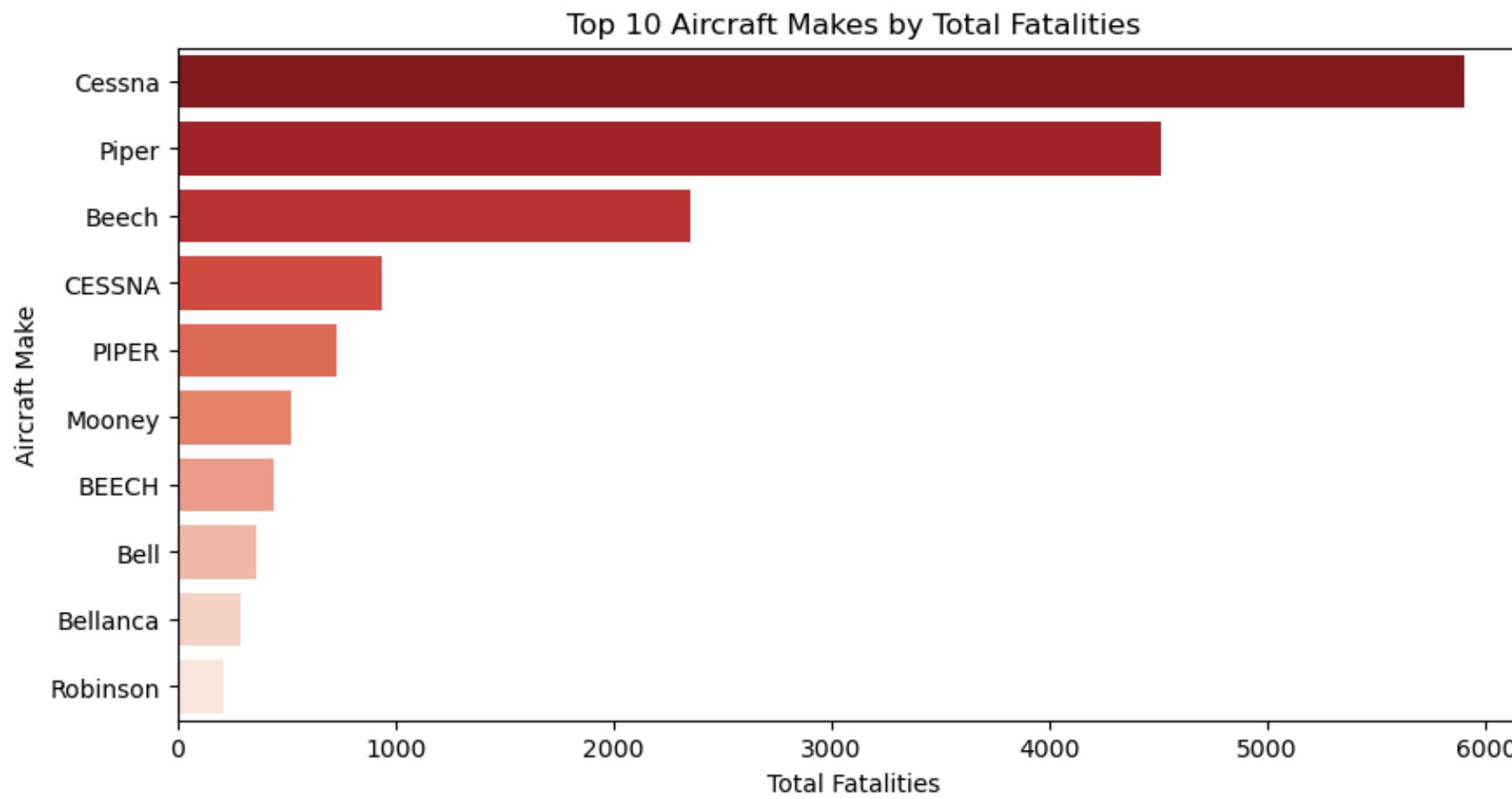
This project analyzes aviation accident data to uncover patterns in aircraft safety, focusing on accident frequency, severity, and fatalities across different models, manufacturers, flight purposes, and engine types.

The insights aim to support airlines, regulators, and manufacturers in making evidence-based decisions on fleet management, safety improvements, and policy development.

# PROBLEM STATEMENT

The aviation industry faces critical challenges in fleet safety management and accident risk mitigation. Despite advances in technology, aviation accidents continue to result in significant fatalities, with varying risk levels across different aircraft types, manufacturers, and operational purposes. Aviation stakeholders, including airlines, fleet managers, and insurance providers, lack comprehensive data-driven insights to guide aircraft acquisition decisions, prioritise safety interventions, and allocate resources effectively. Without understanding which aircraft models, engine types, and flight operations carry the highest risk, companies may inadvertently invest in higher-risk assets or fail to implement targeted safety measures where they're most needed. This gap in actionable intelligence exposes organisations to increased operational risk, higher insurance costs, potential regulatory penalties, and, most critically, preventable loss of life. The absence of systematic risk analysis across the aviation fleet threatens both business sustainability and public safety.

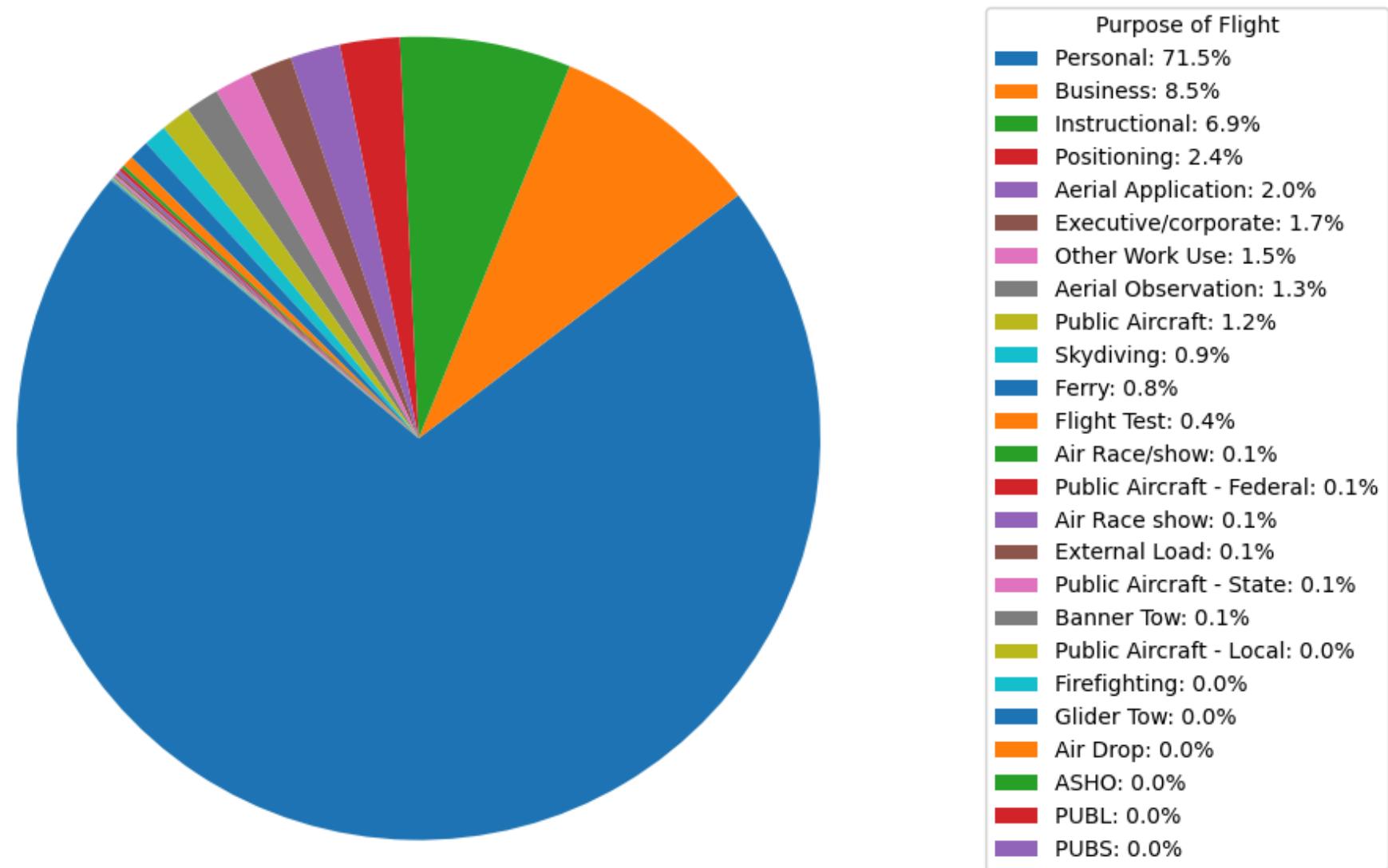
Visual 1: Aircraft Makes by Total Fatalities



- The analysis shows that some aircraft manufacturers appear more frequently in accident records than others.
- Brands with the highest number of accidents may reflect higher usage in the industry, but they also highlight areas that may need stricter safety oversight.
- On the other hand, brands with fewer reported accidents may be considered lower-risk and could serve as safer options for operators and investors to prioritise.
- This insight enables stakeholders—such as regulators, buyers, and operators—to make more informed decisions when selecting aircraft for various types of operations.

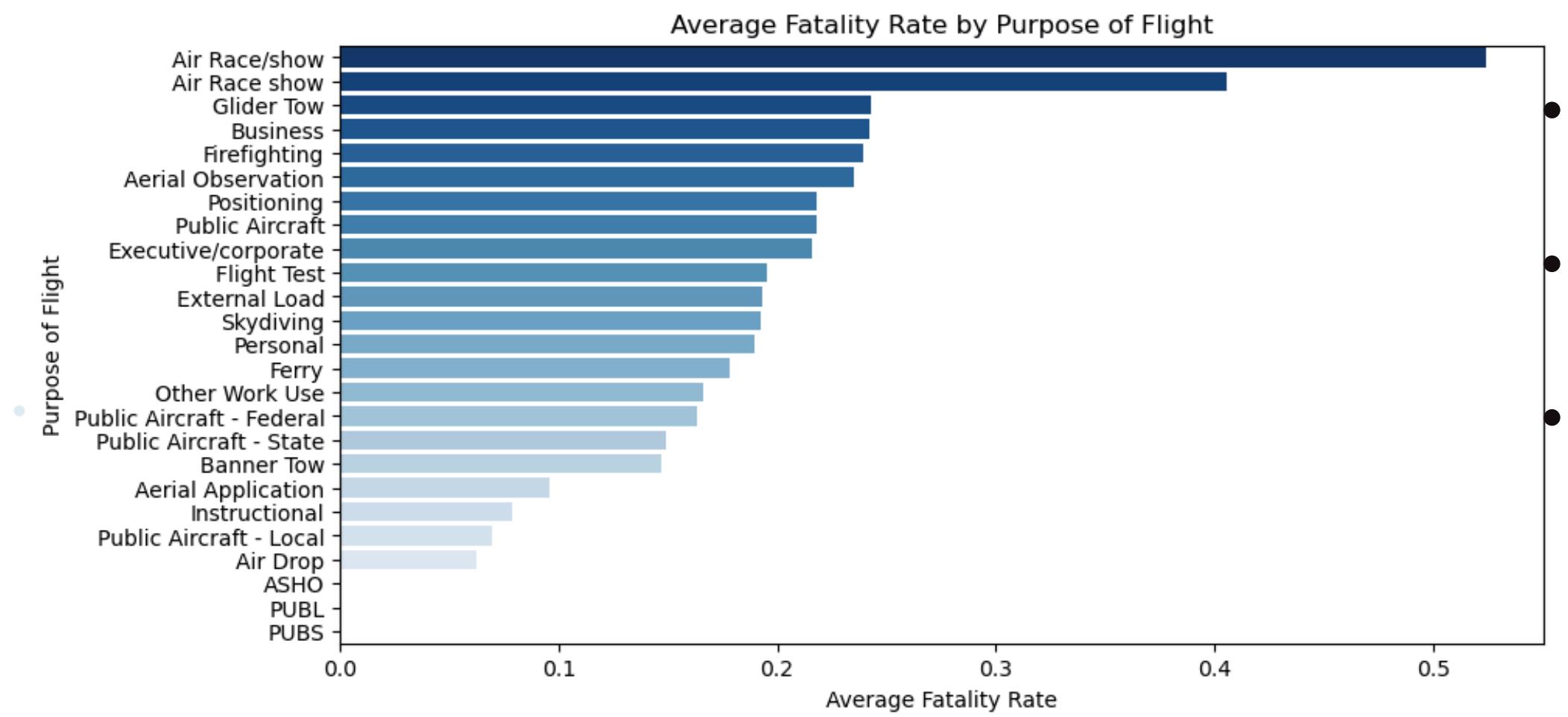
Visual 2: Fatalities by Purpose of Flight

Total Fatalities by Purpose of Flight



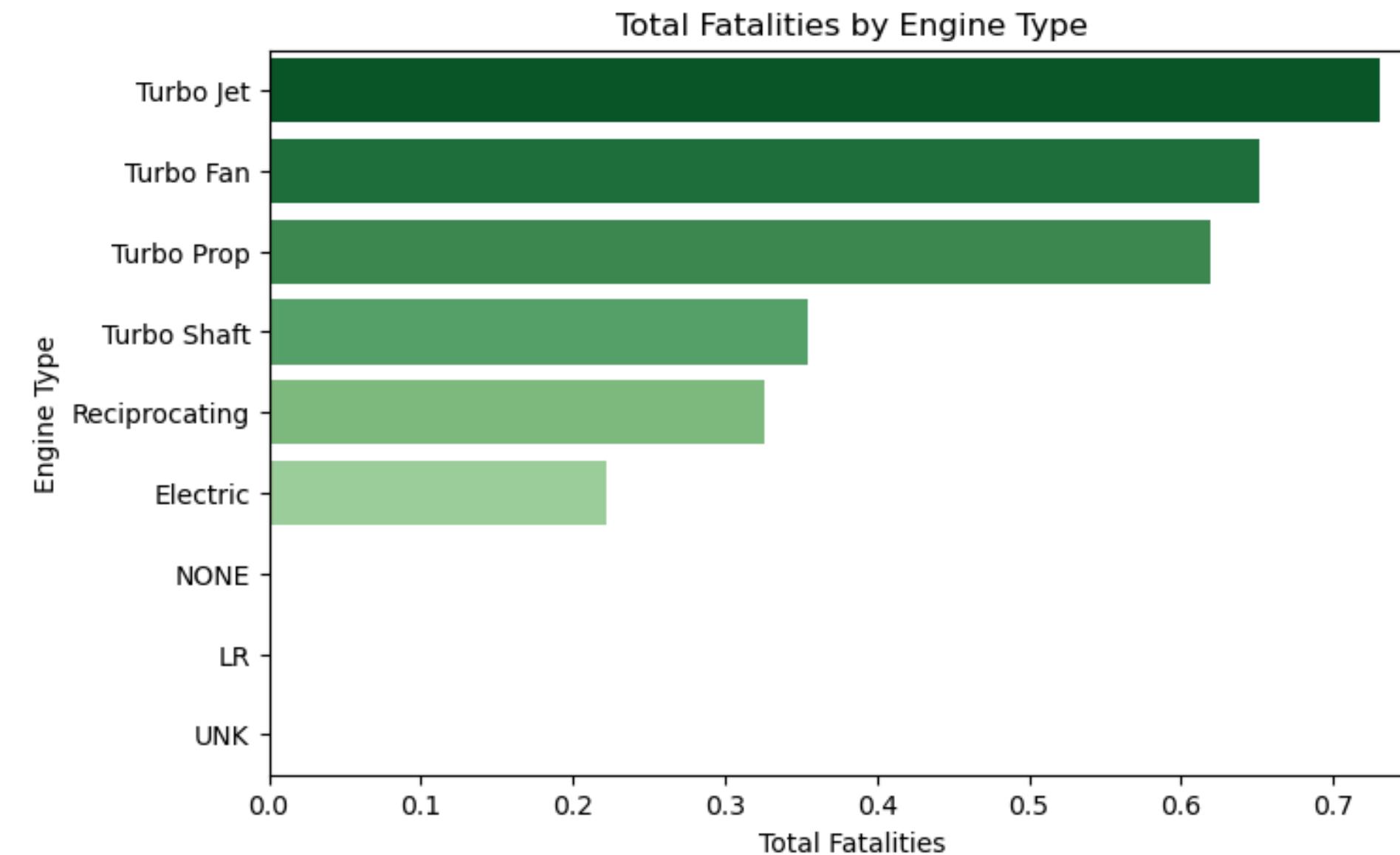
- Certain flight purposes, such as personal/private flying, tend to account for more fatalities.
- Commercial and instructional flights show fewer fatalities in comparison.
- This highlights how the reason for flying can strongly influence safety outcomes.

Visual 3: Fatality Rates by Flight Purpose



- Beyond raw accident counts, the fatality rate gives deeper insight into risk.
- Some flight purposes, though less common, have a higher likelihood of death when accidents occur.
- This provides regulators and operators with guidance on where to prioritise safety improvements.

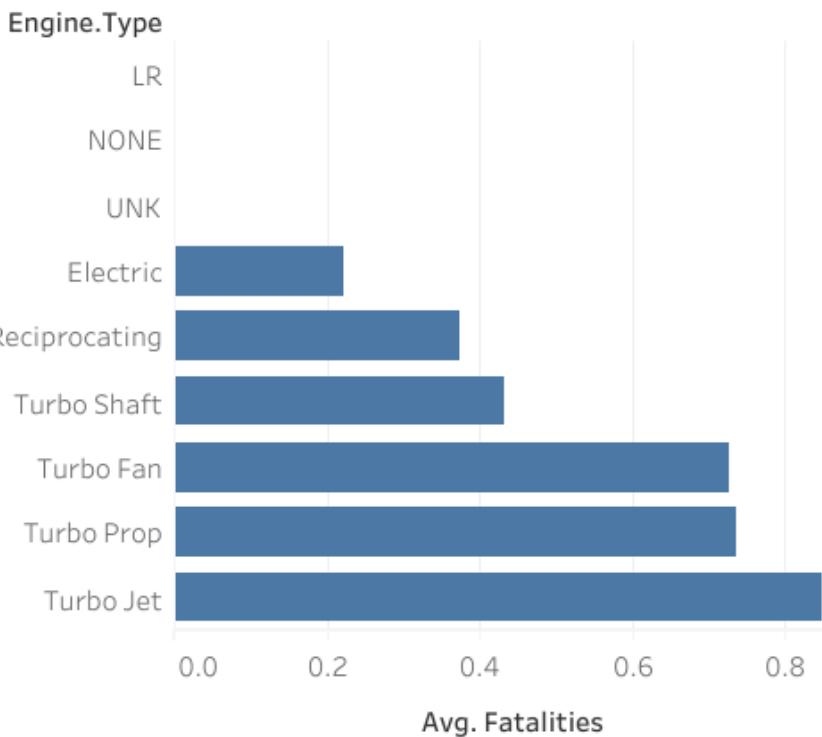
Visual 4: Total Fatalities by Engine Type



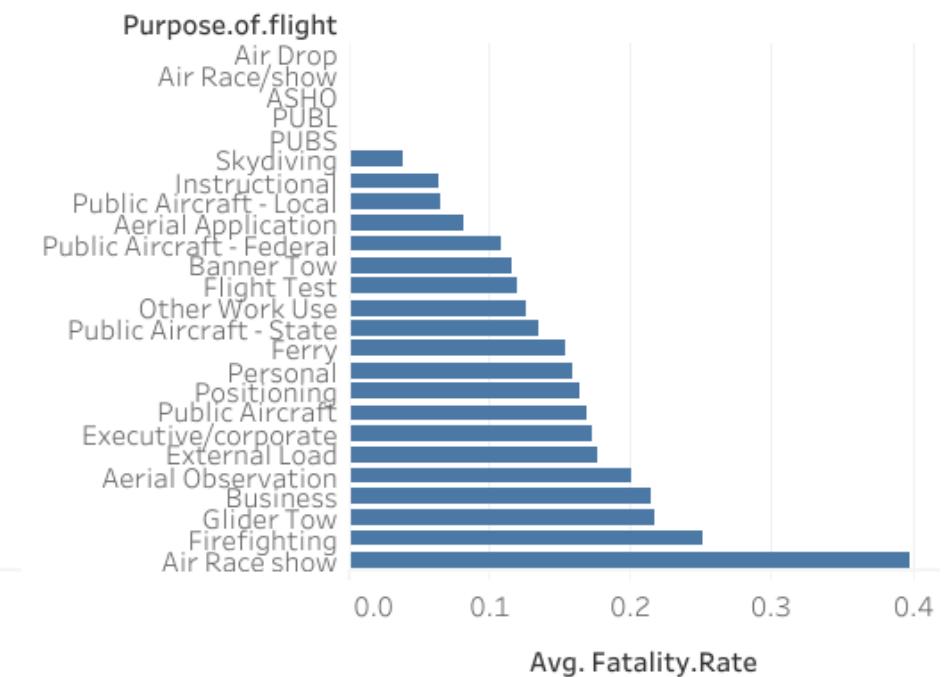
- Different engine types show varying levels of risk when accidents occur.
- Reciprocating and turboprop engines are linked to higher historical fatality counts compared to jet engines.
- This information helps guide fleet safety planning, pilot training focus, and maintenance priorities.

# Dashboard of Major Visuals

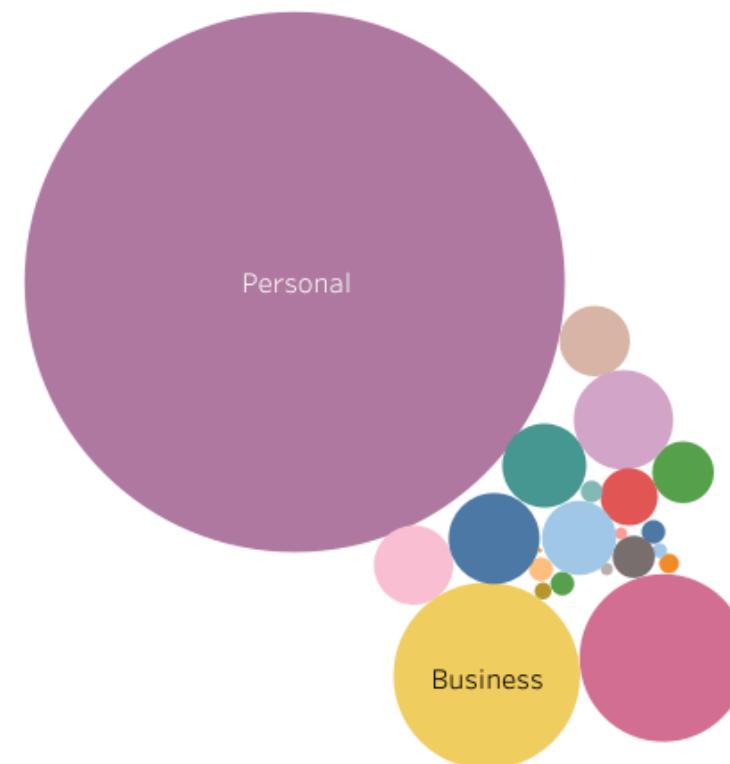
Total Fatalities by Engine Type



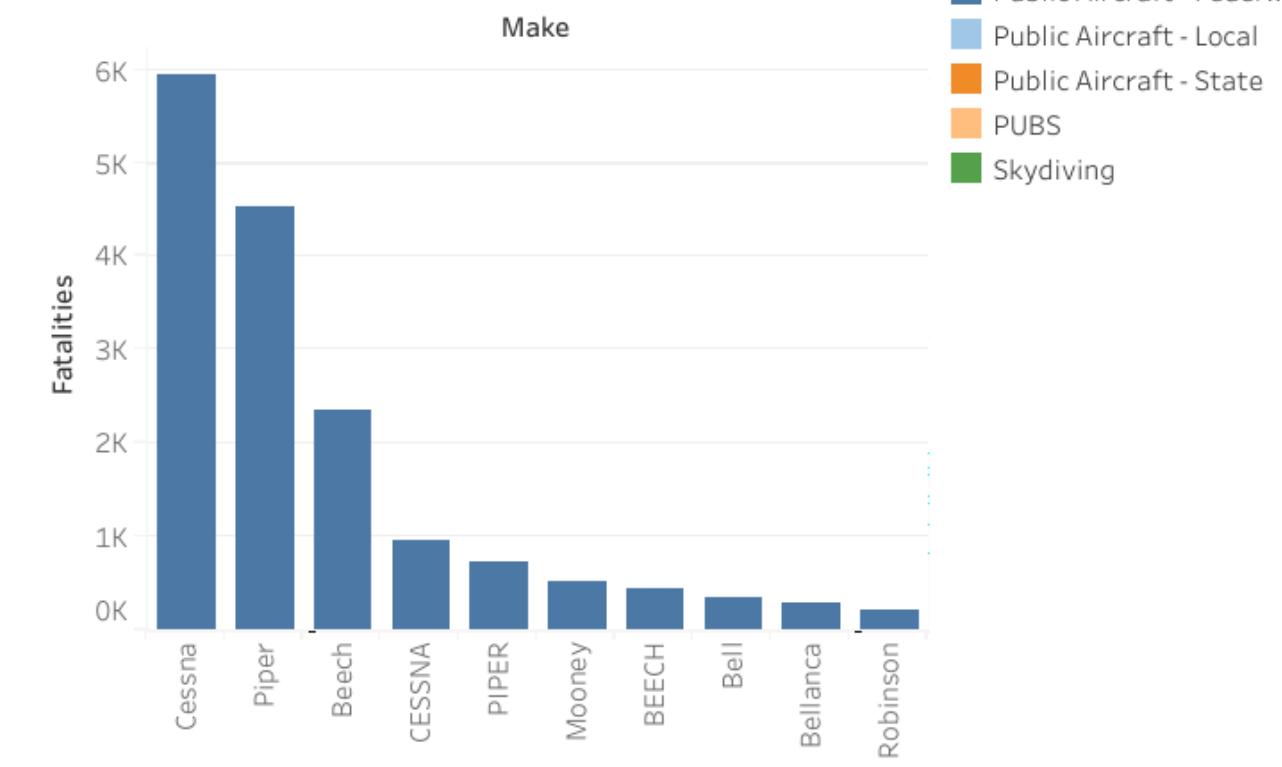
Average Fatality Rate by Purpose of Flight



Fatalities by Purpose of Flight



Top 10 Aircraft Makes by Total Fatalities



- Purpose.of.flight
  - Aerial Application
  - Aerial Observation
  - Air Drop
  - Air Race show
  - Air Race/show
  - ASHO
  - PUBL
  - PUBS
  - Skydiving
  - Instructional
  - Public Aircraft - Local
  - Aerial Application
  - Public Aircraft - Federal
  - Banner Tow
  - Flight Test
  - Other Work Use
  - Public Aircraft - State
  - Ferry
  - Personal
  - Positioning
  - Public Aircraft
  - Executive/corporate
  - External Load
  - Business
  - Glider Tow
  - Firefighting
  - Aerial Observation
  - Business
  - Glider Tow
  - Firefighting
  - Air Race show
  
- Make
  - Public Aircraft
  - Public Aircraft - Feder..
  - Public Aircraft - Local
  - Public Aircraft - State
  - PUBS
  - Skydiving

# KEY TAKEAWAYS

Accident frequency differs by brand, offering insights for buyers, operators, and regulators.

Safety risks are not uniform; some flight purposes carry greater fatality risks than others.

Fatality rates reveal hidden risks that raw accident counts may not show.

Understanding which engine types are associated with higher fatalities supports better decision-making in aircraft operations and procurement.

# ACTION PLAN

Prioritise aircraft models and manufacturers that consistently show lower accident severity and risk scores.

Strengthen safety protocols for personal and private flights, which contribute the highest share of accidents and fatalities.

Pay special attention to engine types linked to higher fatalities, ensuring robust maintenance cycles and inspections.

Understanding which engine types are linked to more fatalities supports better decision-making in aircraft operations and procurement.

# INSIGHTS RECAP

## ANALYSIS

Analyzed accident data to spot trends by model, purpose, and engine type.

## KEY RISKS

Identified key risk areas where fatalities and accidents are concentrated.

## ACTION PLAN

Proposed clear actions to guide safer fleet choices and stronger safety measures



# CONTACT ME TODAY

## WEBSITE

jamesowitiportfolio.vercel.app

## EMAIL

james.owiti1.moringaschool.com

Presented by:  
James Owiti