



Aviation Research

Data-Driven Recommendations for Aircraft Purchases in Commercial and Private Aviation.



Overview

Purpose of the Presentation

Our company is expanding into the aviation industry and needs to understand the risks associated with different aircraft to make informed purchasing decisions.

Main Goals

- Identify low-risk aircraft.
- Provide actionable insights.
- Support data-driven decision-making.



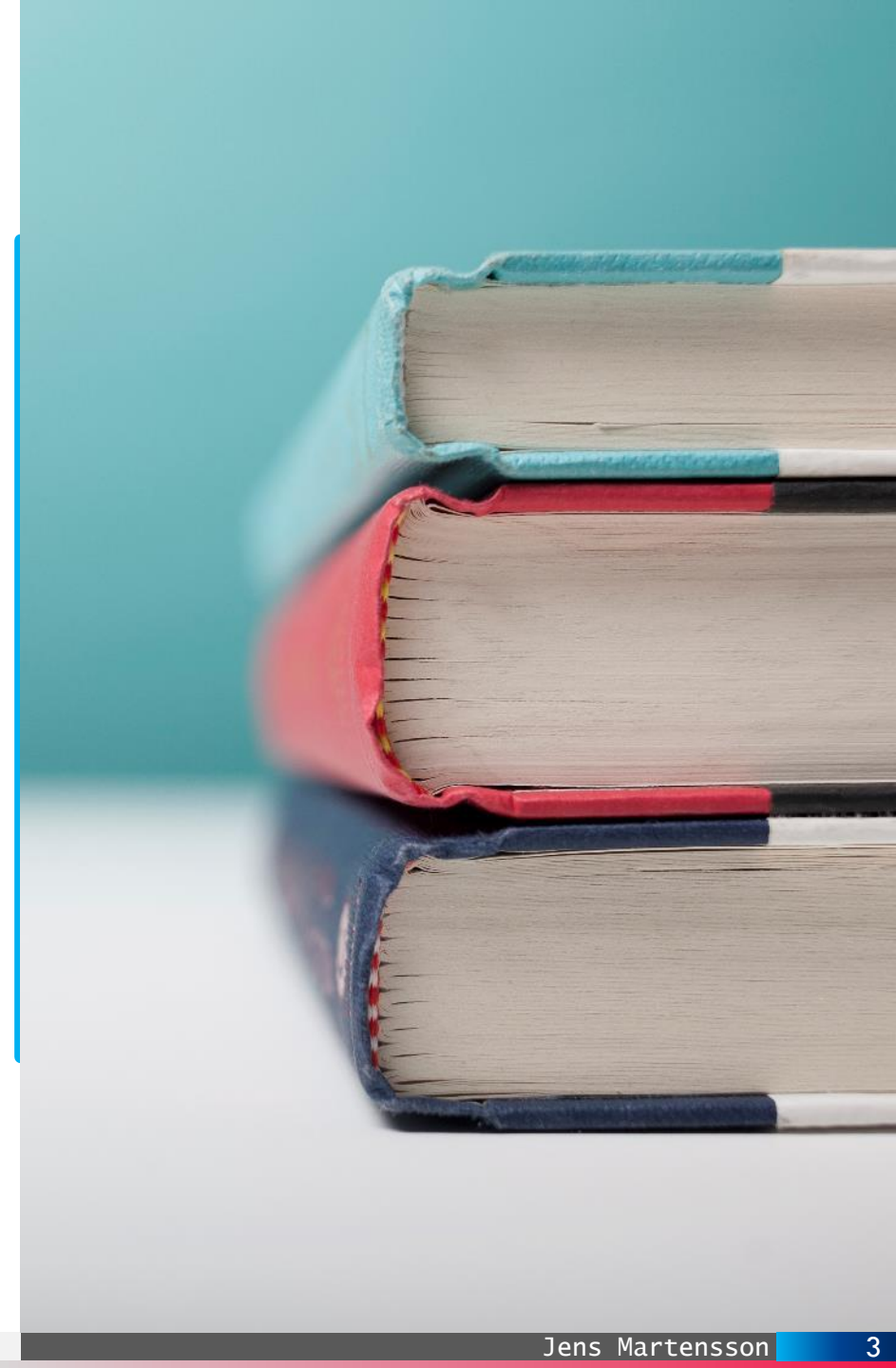
Business Understanding

Business Problem

The company aims to diversify its portfolio by entering the aviation industry. The primary challenge is to identify which aircraft have the lowest risk for purchase and operation in commercial and private enterprises.

Objectives

- Analyze historical aviation accident data.
- Determine key risk factors associated with different aircraft.
- Provide three concrete recommendations to guide the company's entry into the aviation market.



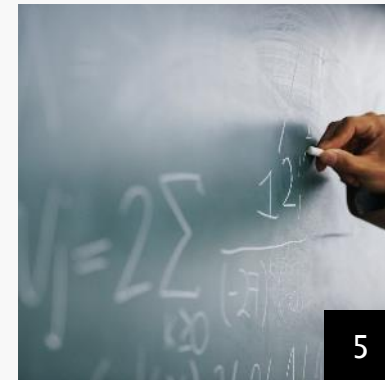
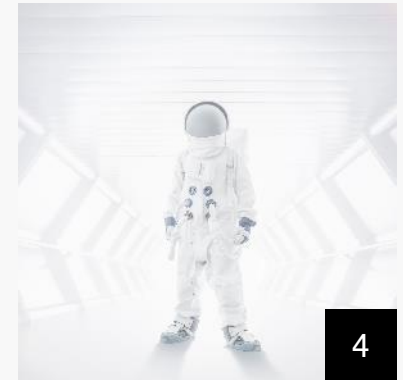
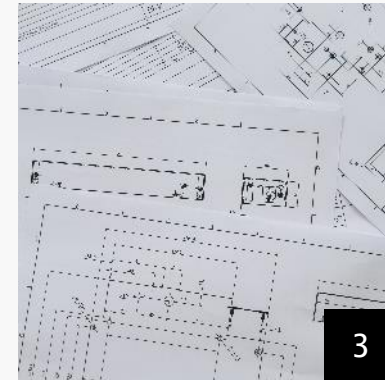
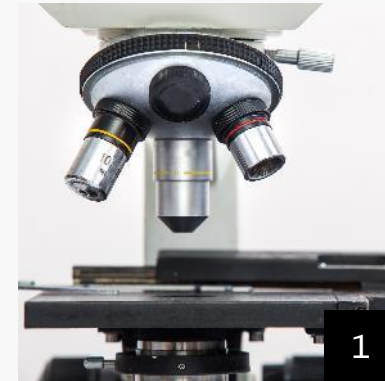
Data Understanding

Overview of the Data

Our analysis is based on a comprehensive dataset from the National Transportation Safety Board (NTSB), spanning from 1962 to 2023. This data includes detailed records of aviation accidents and incidents.

Key Data Points

- **Injury Severity:** This indicates the level of injury in an incident, such as Fatal or Non-Fatal.
- **Aircraft Damage:** This details the extent of damage to the aircraft, categorized as Destroyed or Substantial.
- **Aircraft Category:** The type of aircraft involved, such as Airplane or Helicopter.
- **Make and Model:** The manufacturer and specific model of the aircraft.
- **Number of Engines:** The count of engines on the aircraft.
- **Engine Type:** The type of engine, for example, Reciprocating or Turbo Fan.
- **Weather Condition:** The weather conditions at the time of the incident, categorized as Visual Meteorological Conditions (VMC) or Instrument Meteorological Conditions (IMC).

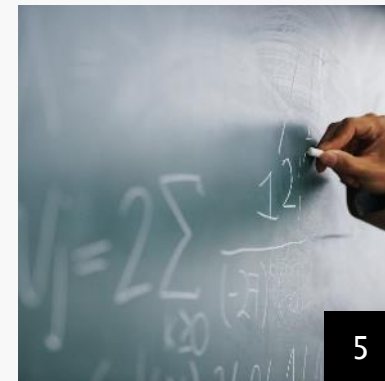
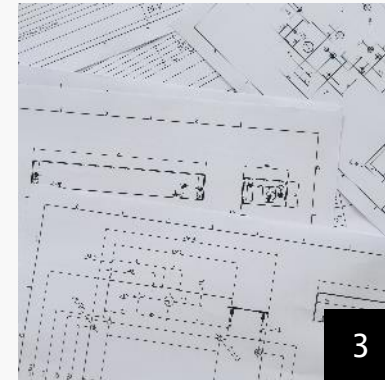
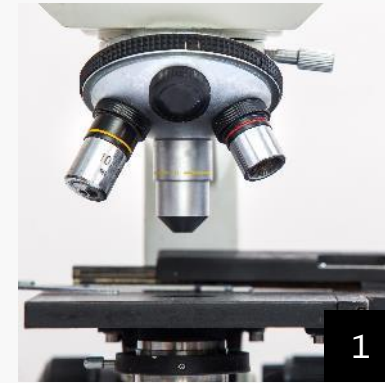


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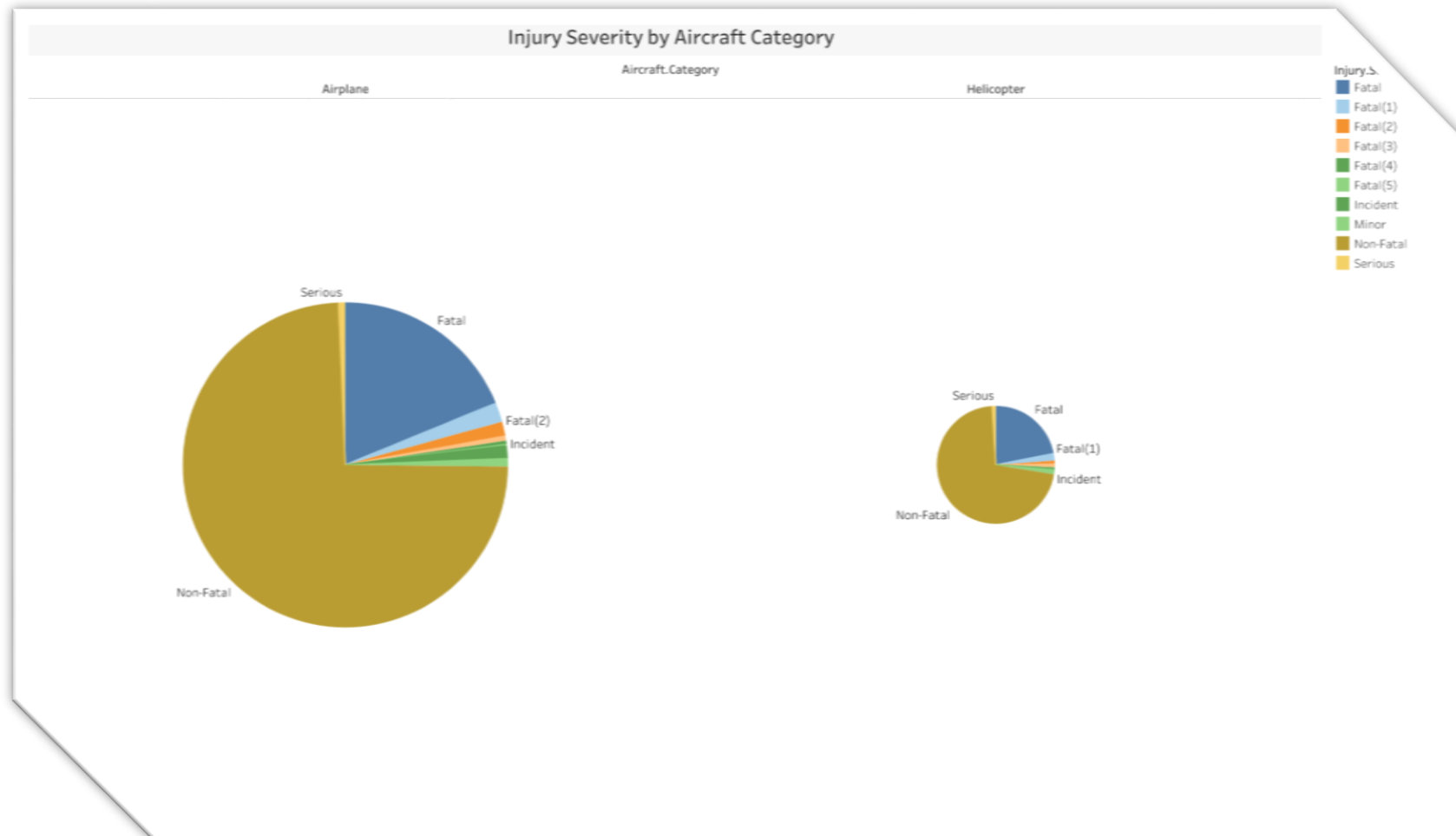
- **Broad Phase of Flight:** The phase of flight during which the accident occurred, such as Takeoff or Cruise.
- **Total Fatal Injuries:** The number of fatalities resulting from the accident.
- **Total Serious Injuries:** The number of serious injuries.
- **Total Minor Injuries:** The number of minor injuries.
- **Total Uninjured:** The number of people who were uninjured in the incident.

Data Preparation

- **Handling Missing Values:** We ensured the data was complete by filling in or addressing missing values appropriately.
- **Removing Duplicates:** Ensured the dataset was clean and accurate by removing any duplicate records.



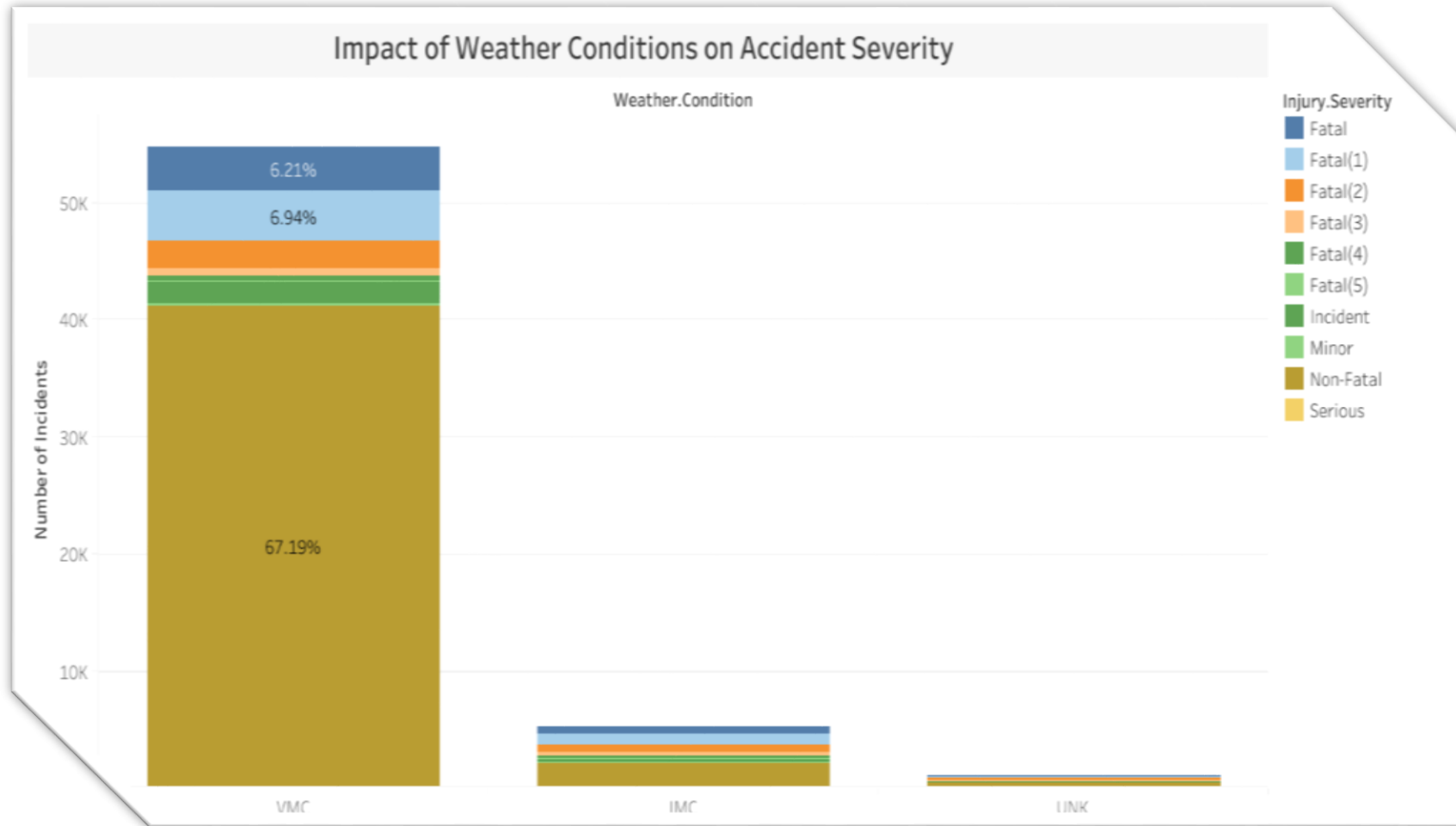
Injury Severity Analysis



Analysis shows Aircrafts have had more Non-Fatal accidents as compare to oher Aircraft Category.

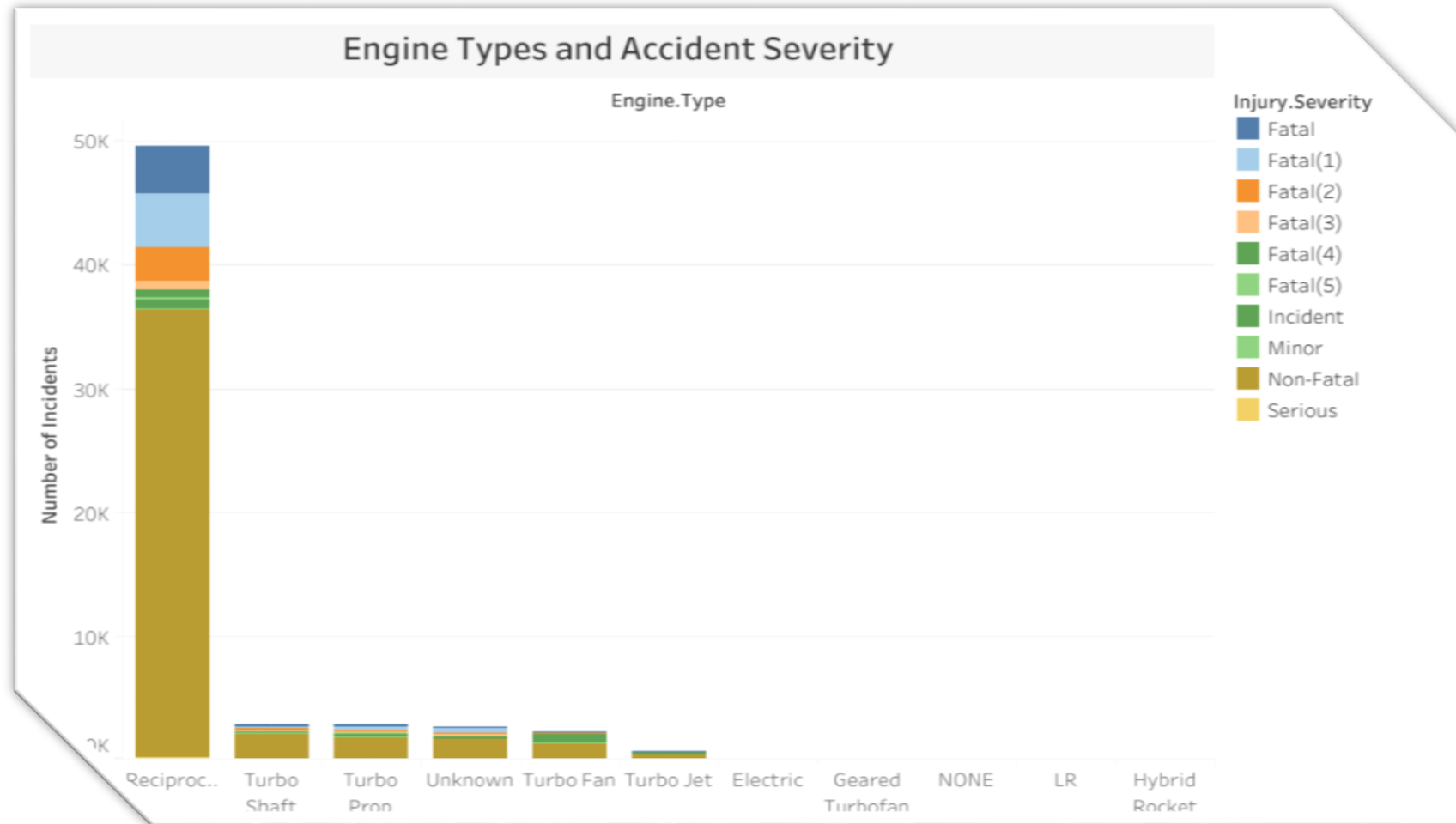
Aircrafts is the most used category of aircraft evident in having the most number of Aircraft accidents.

Weather Condition Impact



Analysis shows there were quite a lot of incidents with Visual Meteorological Conditions (VMC) than Instrument Meteorological Conditions (IMC).

Engine Type Analysis



Reciprocating engines seem to yield accidents that are mostly Non-Fatal therefore being the more recommended kind of engines compared to the other ones.

Business Recommendations

Invest in Aircraft with Proven Safety Records

- Recommendation: Prioritize the acquisition of aircraft models and makes that have consistently demonstrated lower injury severity rates.
- Rationale: By focusing on aircraft with lower fatality and injury rates, we can mitigate potential risks and enhance passenger safety.

Implement Robust Safety Protocols for Adverse Weather Conditions

- Recommendation: Develop comprehensive operational guidelines and safety measures for flights operating under Instrument Meteorological Conditions (IMC).
- Rationale: Our analysis indicates that weather conditions significantly impact the severity of accidents. By focusing on IMC conditions, we can reduce the likelihood of severe accidents.

Opt for Aircraft with Reliable Engine Types

- Recommendation: Choose aircraft models that use Reciprocating engine types that have lower associated risks, as identified in our analysis.
- Rationale: Different engine types exhibit varying safety records, with some types showing a higher propensity for severe accidents.





Thank You

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