Aviation Risk Analysis

Business Overview

•Goal: To identify low-risk aircraft models for purchase.

•Dataset: Process aviation incident records.

•Focus: Minimize operational and reputational risks

Business Understanding

•Company expanding into aviation sector.

•Need for safe and reliable aircraft selection.

•Objective: Reduce accident risks, improve operational safety.

Data Understanding

Public aviation incident records:
~ 88,000 entries

Key Fields:
- Aircraft Model
- Event Date
- Injury Severity
- Aircraft Damage

•**Definitions:**
•*Fatal Injury:* Death due to accident.

•*Aircraft Damage:* Extent of physical damage post-incident.

Data Analysis Process

- **EDA:**
  - Identified patterns and trends in incidents.
  - Reviewed accident rates by model and severity.

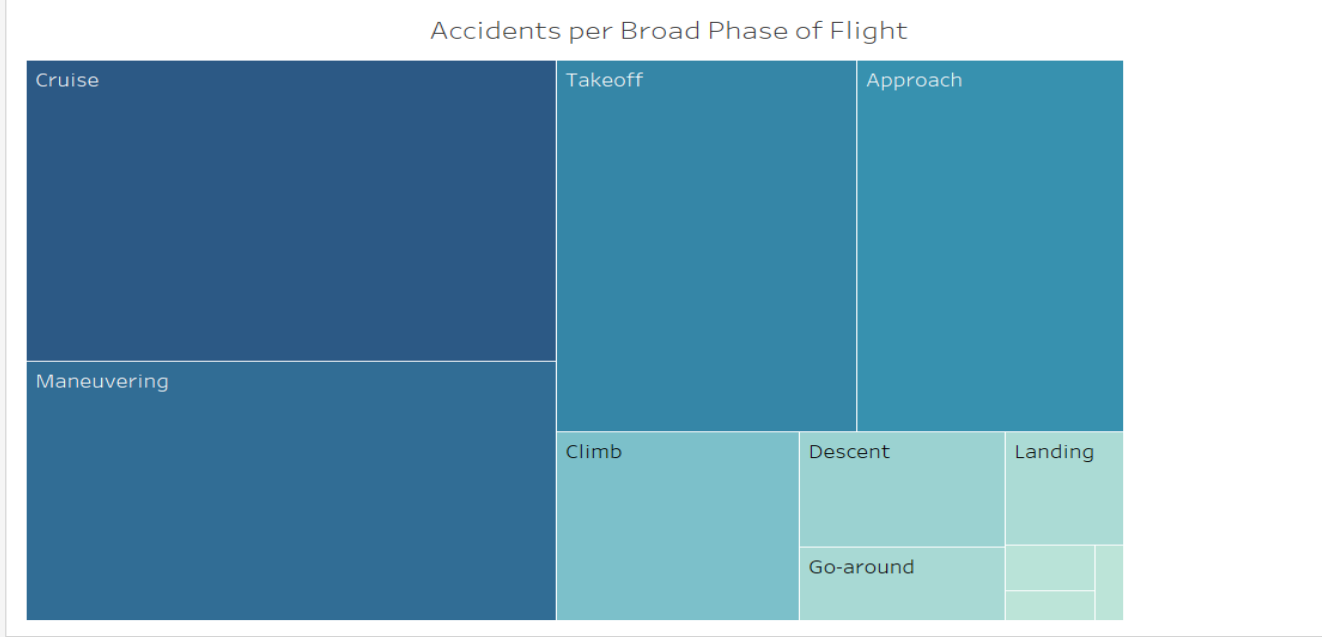
- **Cleaning:**
  - Removed duplicates.
  - Handled missing values.
  - Standardized injury severity and damage categories.
  - Converted event dates to year.

Definitions:

- ***EDA:*** First exploration of data for patterns.

- ***Data Cleaning:*** Correcting or removing errors in data.

Data Presentation and Interpretation



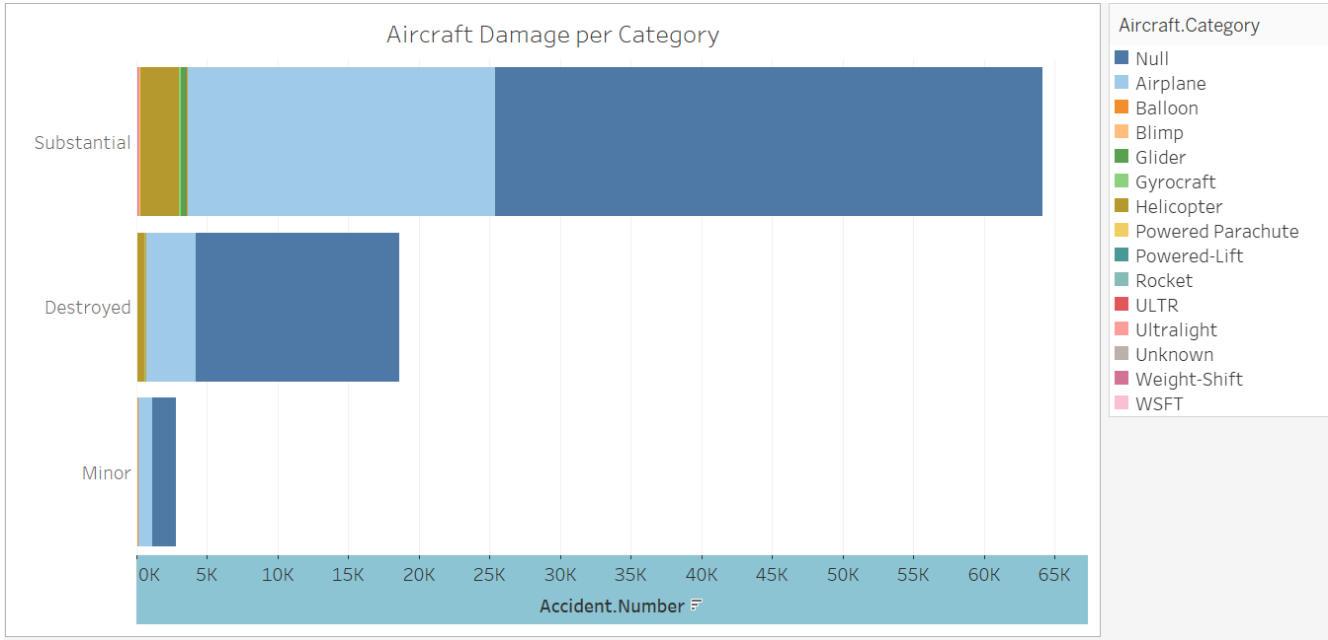
Most accidents occur during the Cruise and Maneuvering phases

•**Cruise phase** (the period when the aircraft is flying level between climb and descent) has the **highest number of accidents**.

•**Maneuvering phase** (low altitude, turning, or adjusting flight path) also shows a **high accident rate**.

•**Business Meaning:** It's important to focus on in-flight training and risk management even **after** takeoff and **before** descent — accidents don't just happen during takeoff or landing.

•**Recommendation:** Invest in **advanced pilot simulator training** focusing on **Maneuvering**



Substantial damage is by far the most common outcome

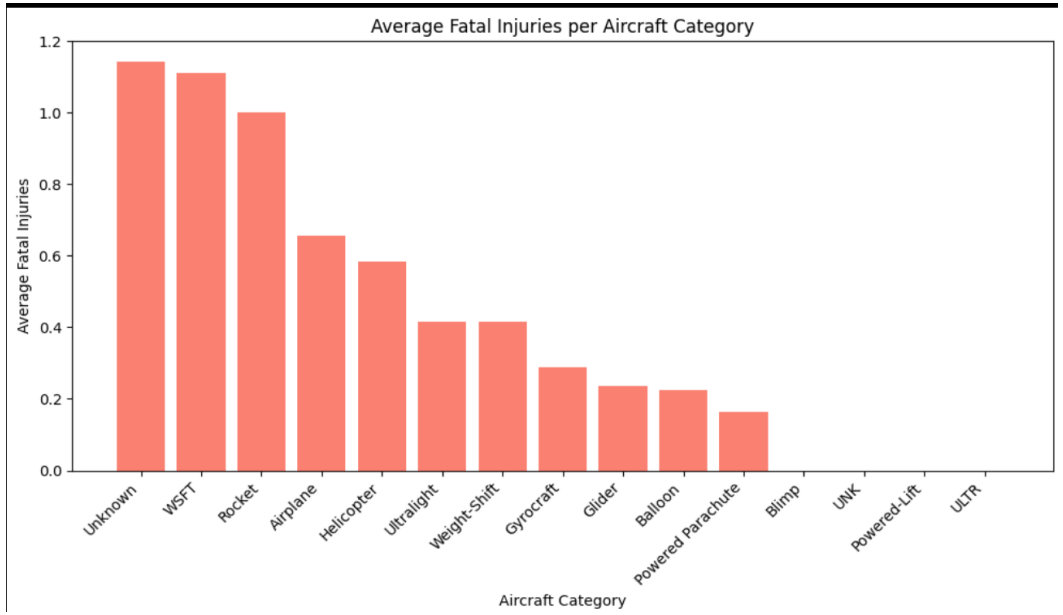
•Most incidents lead to **substantial damage** rather than minor damage or total destruction.

•Substantial damage often requires **major repairs** but the aircraft may still be recoverable.

Business Meaning: Insurance, repair, and maintenance costs will be significant — but total aircraft loss is less common than expected.

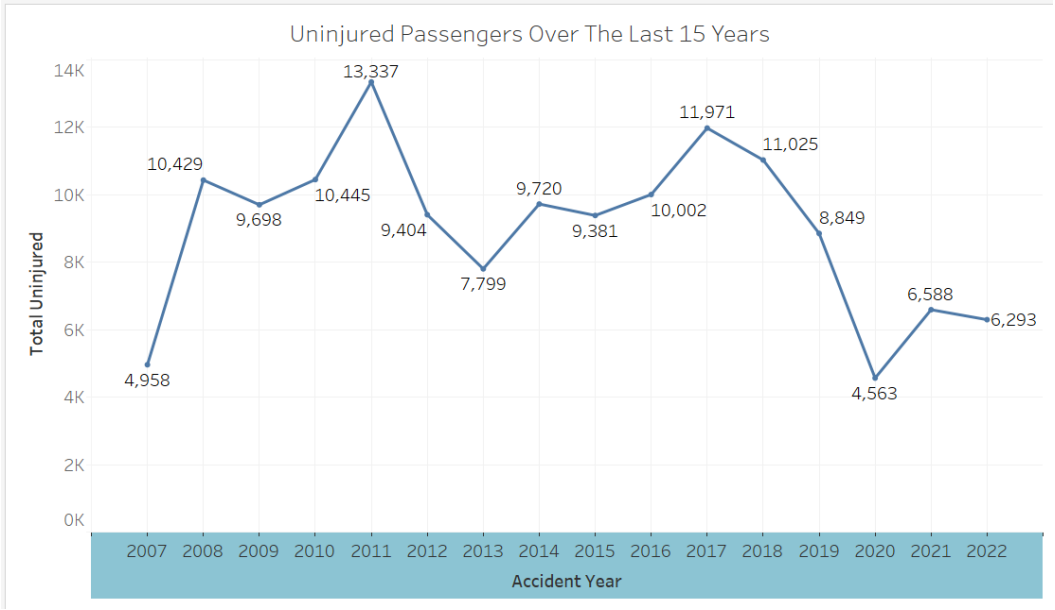
Recommendation: Invest in Comprehensive Maintenance Programs

Data Presentation and Interpretation



Purchase models with fewer fatal injuries:

Safer models may have cheaper insurance and fewer maintenance issues



Decline in the number of uninjured

A decline in the number of uninjured passengers suggests that more people are sustaining injuries during incidents.

This could be due to factors such as:

- Poor cabin safety procedures
- Inadequate use of safety belts or cabin equipment failures

Recommendations:

- Enhance In-Cabin Safety Procedures
- Invest in Crew Safety Training

Recommendations:

- Purchase aircraft models with low fatality history.
- Implement maintenance and pilot training programs.
- Monitor ongoing incident trends post-purchase.
- Focus mid-flight safety procedures.
- Invest in takeoff/landing training.
- Maintain but don't overly prioritize these phases.

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•**Prompt:** "Should we prioritize newer aircraft models (higher cost, lower risk) or older models (lower cost, higher risk)?"