Aviation Accident Presentation

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github repo: https://github.com/ericgiitwa/airport_cleaning

Tableau public:Aviation Accident Project | Tableau Public

INTRO

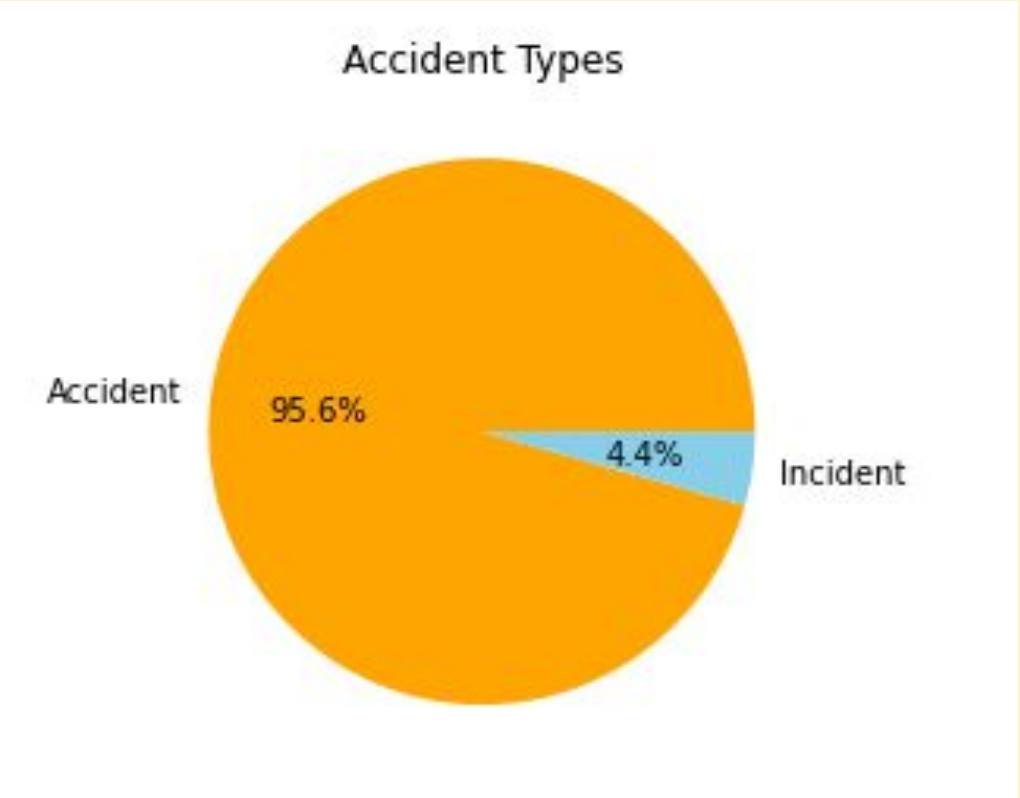
- This presentation will explore the main reasons behind aviation accidents dating back to 1948.

- We aim to identify patterns and causes to provide suggestions for improving the safety of air travel.

Aviation Accidents Investigation

Following our analysis, the evidence indicates that a significant proportion of incidents are classified as accidents. This raises the question:

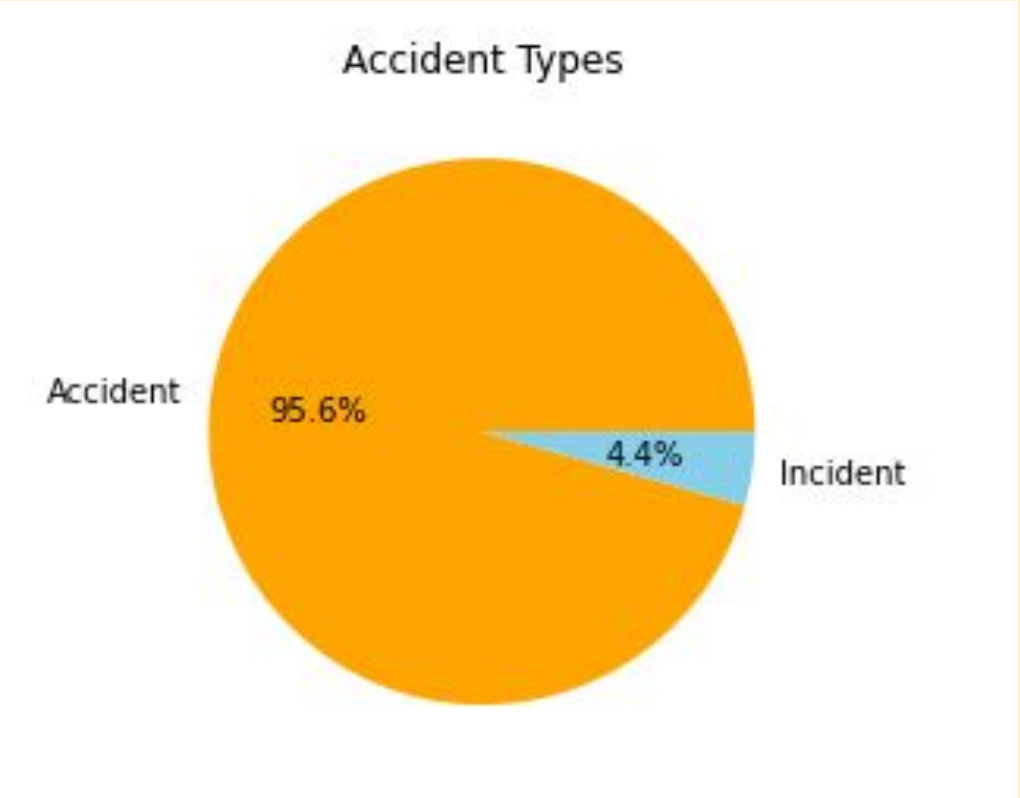
what caused these accidents?



Aviation Accidents Investigation

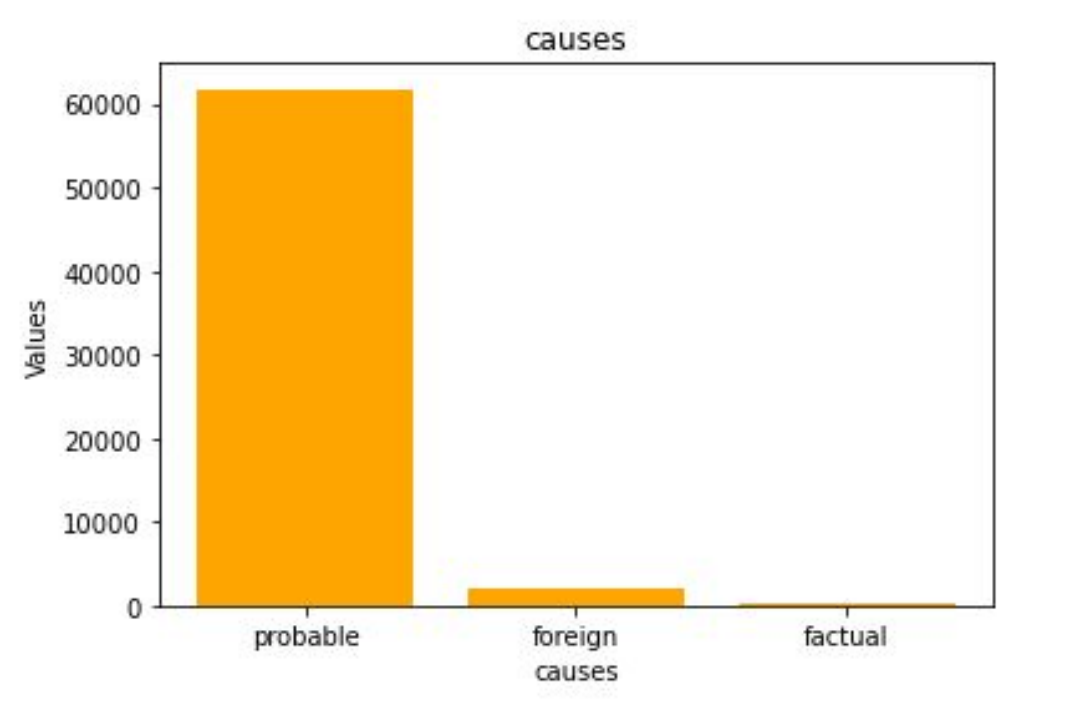
Aviation accidents can result from various factors, including:

- Pilot Error:
- Mechanical Failures:
- Weather Conditions:
- Air Traffic Control
- Maintenance Issues:



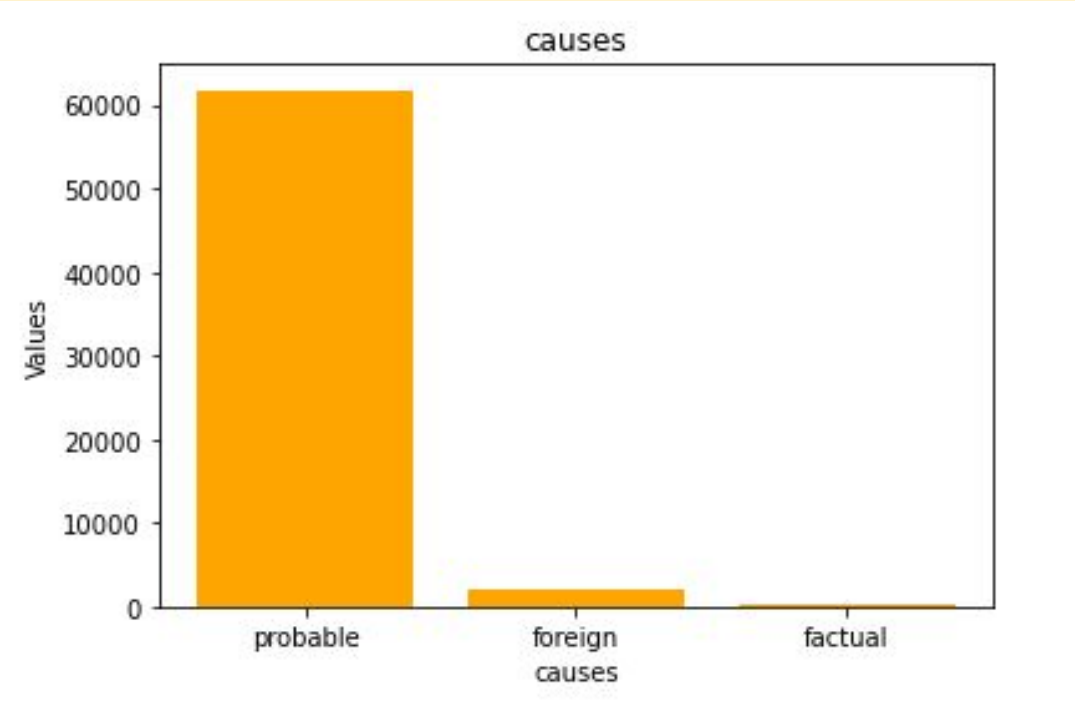
Accident Causes

Our analysis has brought us to the conclusion that majority of the accident is caused by Probable Cause



To truly understand the cause, each report status statement is different, each statement has to be read individually to truly understand the cause of the each crash.

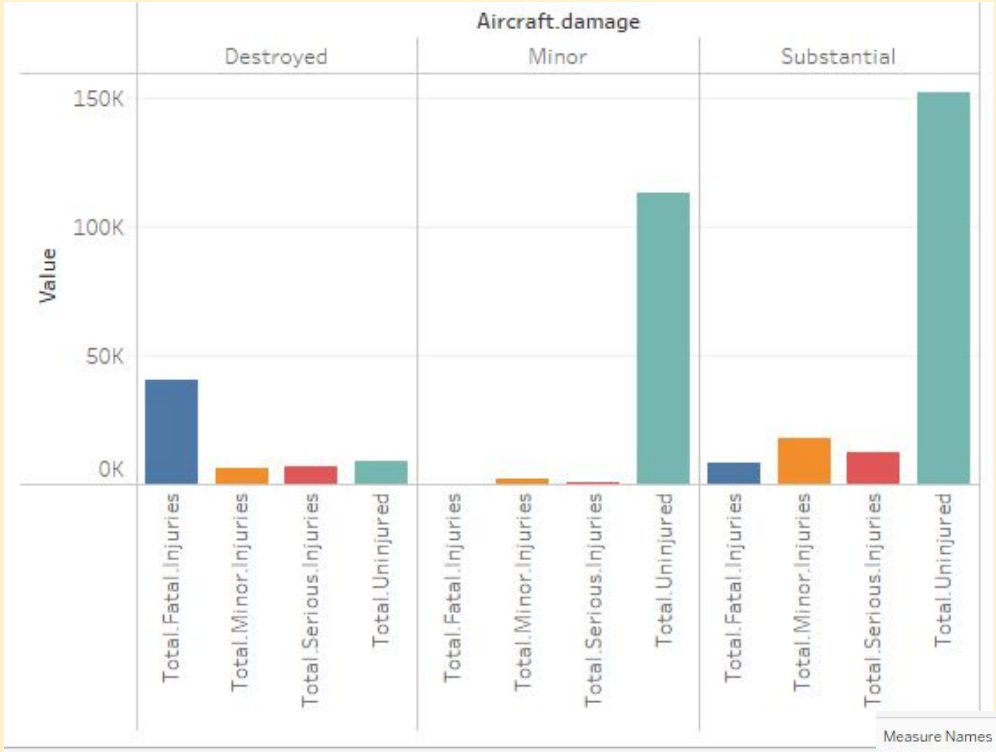
Accident Causes



Damages and Injuries

The number of fatal injuries increased as the level of aircraft damage worsened.

On the other hand, the least number of non-fatal injuries happened with minor or substantial damage.

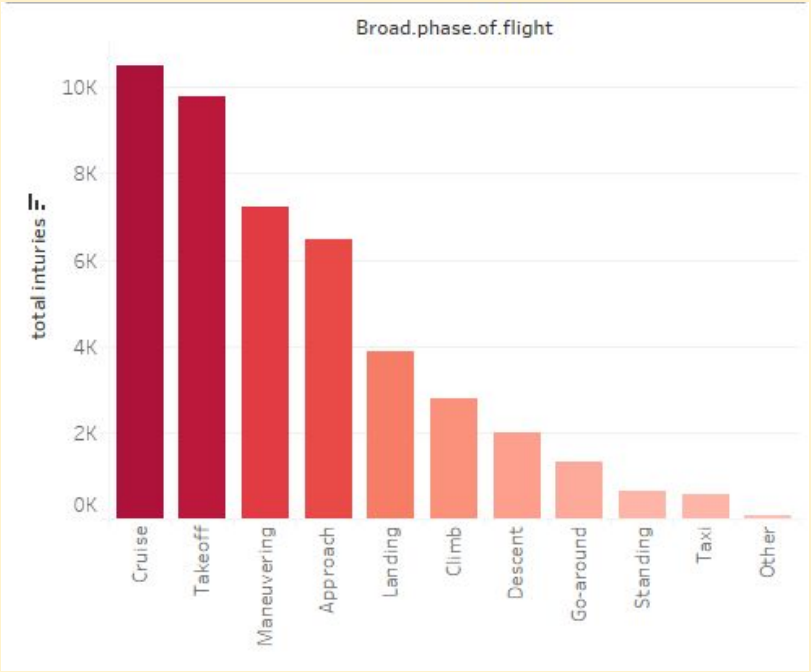


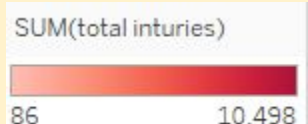
Phase of Flight

Most injuries occur during cruising as the plane is at a much higher altitude and crashing at those heights are more devastating

Most airplane crashes occur during the **takeoff and landing phases** of a flight.

These phases are more complex and involve rapidly changing variables like speed, altitude, and environmental conditions, making them inherently riskier than cruising at high altitudes.

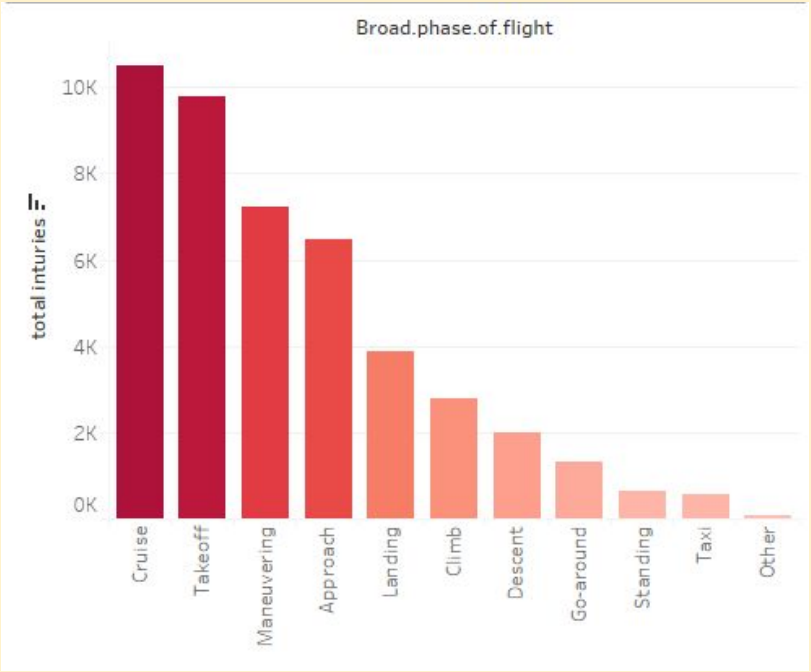


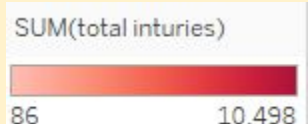


suggested solutions:

- Train pilots more on landing and takeoff emergency scenarios
- Increase their mandatory flight hours on a training simulator as Prospective commercial pilots typically log at least 250 hours of flying time to earn their license

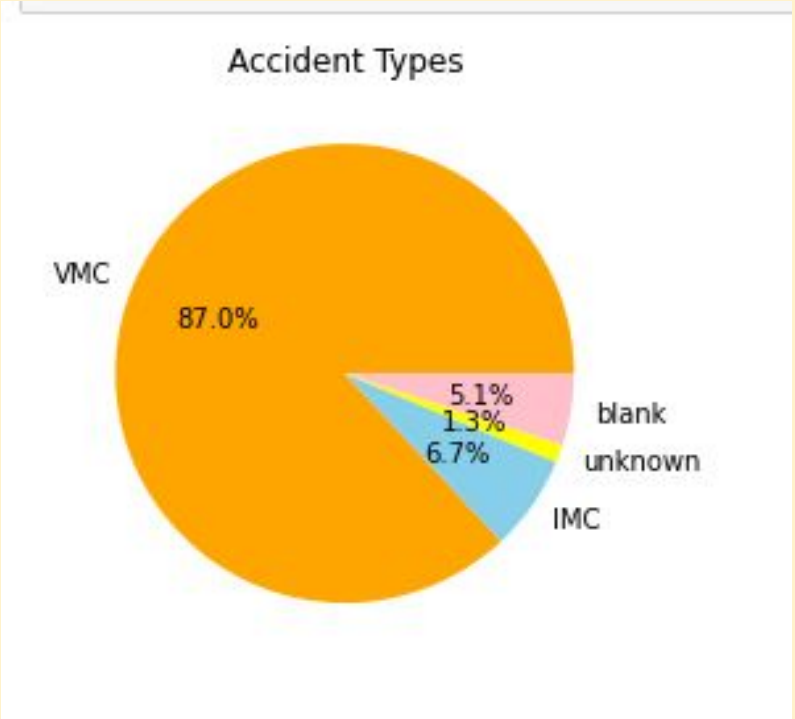
Phase of Flight





Investigating Weather Conditions

Most of the time, weather conditions are clear. Flights are usually canceled when the weather conditions becomes too dangerous. As a result, most of the data shows flights operating in visible weather conditions, meaning that weather is not a major cause of crashes.



VMC= Visual Meteorological Conditions, "IMC"=Instrument Meteorological Conditions.,unk = unknown

Aircraft Carrier Accident Map

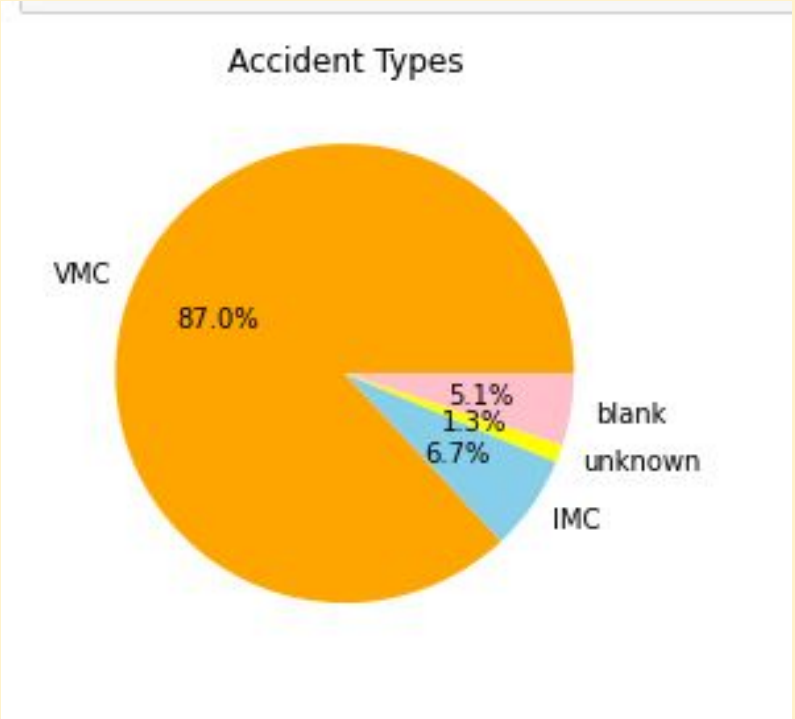
Country/Weather Location Map

Analyzing the accident density map alongside the weather location map reveals that weather is not a significant factor in the occurrence of accidents, as most incidents in the United States take place under clear, visible conditions.

Investigating Weather Conditions

Causes of accidents during clear weather:

- Human Error
- Overconfidence
- Complex Air Traffic
- Distractions
- Runway Incursions:
- Traffic control miscommunications

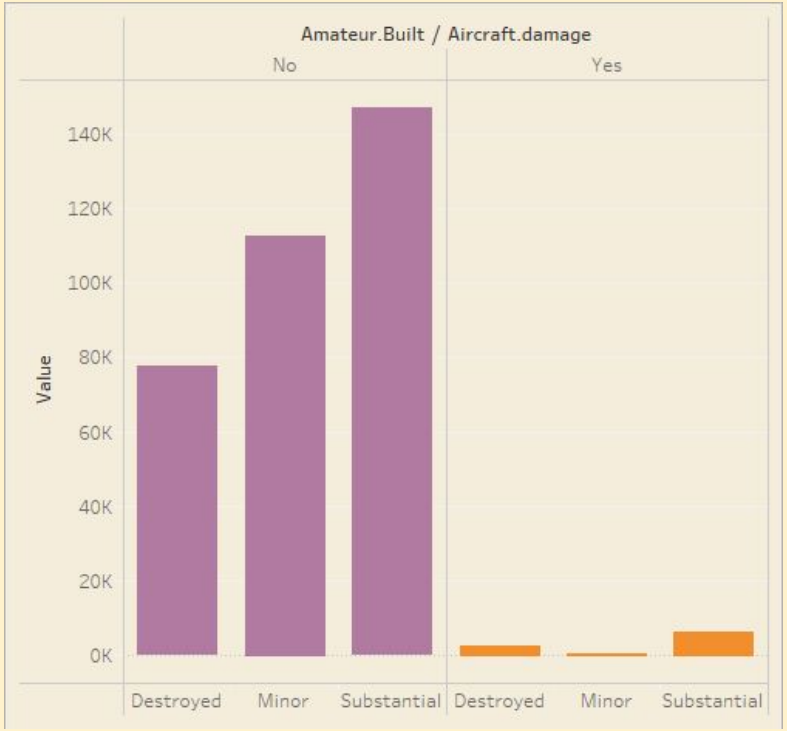


Possible Solutions for VMC Accidents

- Optimize air traffic management systems with AI-based solutions for smoother coordination.
- Improve communication tools between pilots and air traffic controllers.
- Expand infrastructure to handle increasing air traffic efficiently.
- Standardize communication protocols to reduce ambiguity.
- Invest in reliable backup systems for uninterrupted communication.

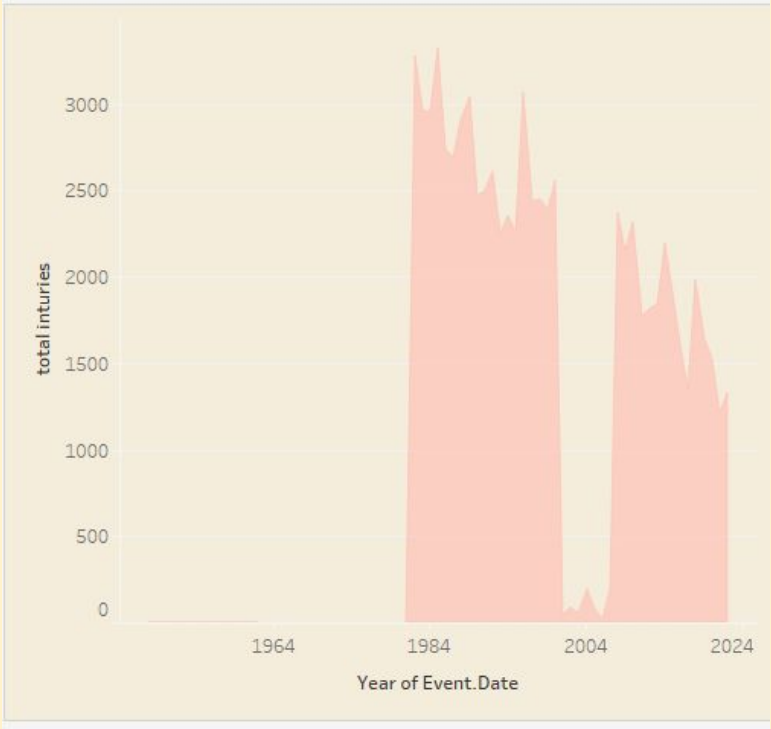
most damage occurs on the non-ameteur planes,although since majority of the dataset is made up of non-ameteur planes there isnt significant data to prove which plane is safer

Aircraft Build vs Damage



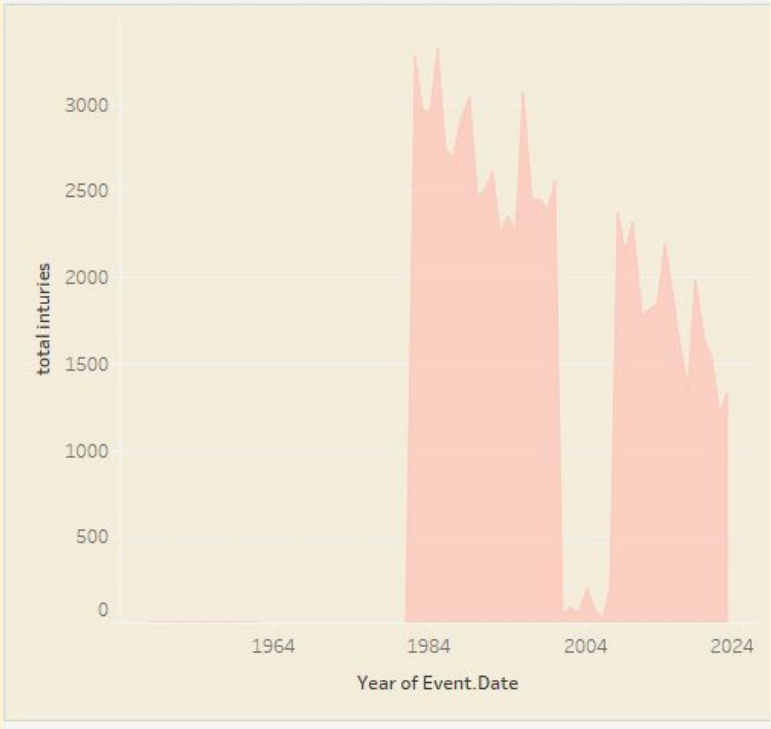
As time progresses,technological advances continue to grow and hence planes are built better with a higher standard for safety, that is why there seems to be a ownward trend towards the total number of injuries.

Injuries per Year



Technological Advances and Safety

- Improved Engines:
- Enhanced Flight Control Systems:
- Advanced Navigation and Communication:
- Predictive Maintenance
- Weather Forecasting:
- Sustainable Aviation Fuels (SAFs)



Analysis

The data shows that 95.6% of crashes are accidents, which happen more often than incidents. Most accidents are caused by pilot error, but there are other factors too, like overconfidence, busy air traffic, distractions, runway problems, and miscommunications with traffic control. Surprisingly, many accidents happen in clear weather.

Landing is the riskiest part of a flight because it involves a lot of factors and little time to fix mistakes. However, as technology improves, airplanes have become safer, and the number of injuries has gone down.

References

www.arnolditkin.com, nci.edu, pilotinstitute.com, flyfreshflight.com, simpleflying.com, intercommedia.org, mprius.com3e3, aviationassociation.com

Questions?