Aviation Risk Analysis

Presented by: Celine Sitina

Overview

The company is expanding into new industries to diversify its portfolio.

Area of interest is purchasing and operating airplanes for commercial and private enterprises.

They want to understand potential risk of aircraft.

Business Understanding

- The company is expanding in to new industries to diversify its portfolio. Specifically, they are interested in purchasing and operating airplanes for commercial and private enterprises
- The business objective is to identify aircrafts with lowest risk for the company to start the business.
- To also provide insight of which aircraft to purchase

Data Understanding

- The dataset is from Kaggle, from the National Transportation Safety Board that includes aviation accident data from 1962 to 2023 about civil aviation accidents.
- The number of records is 90347
- The major focus was on the aircraft category, type of engine, injury severity,Total Fatalinjuries, weather conditions, Broad phase of flight, country and the aircraft make.

Data Analysis

- The dataset had missing values that I replaced some with unknown for categorical data ,median, mode and zero.
- Added an extra column of year and month to help visualize the trend over time.
- Cleaned the injury severity dropping the NaN type.
- Tools:
  - Python for data analysis and cleaning
  - Tablue for visualizations

Aircraft types and their risk

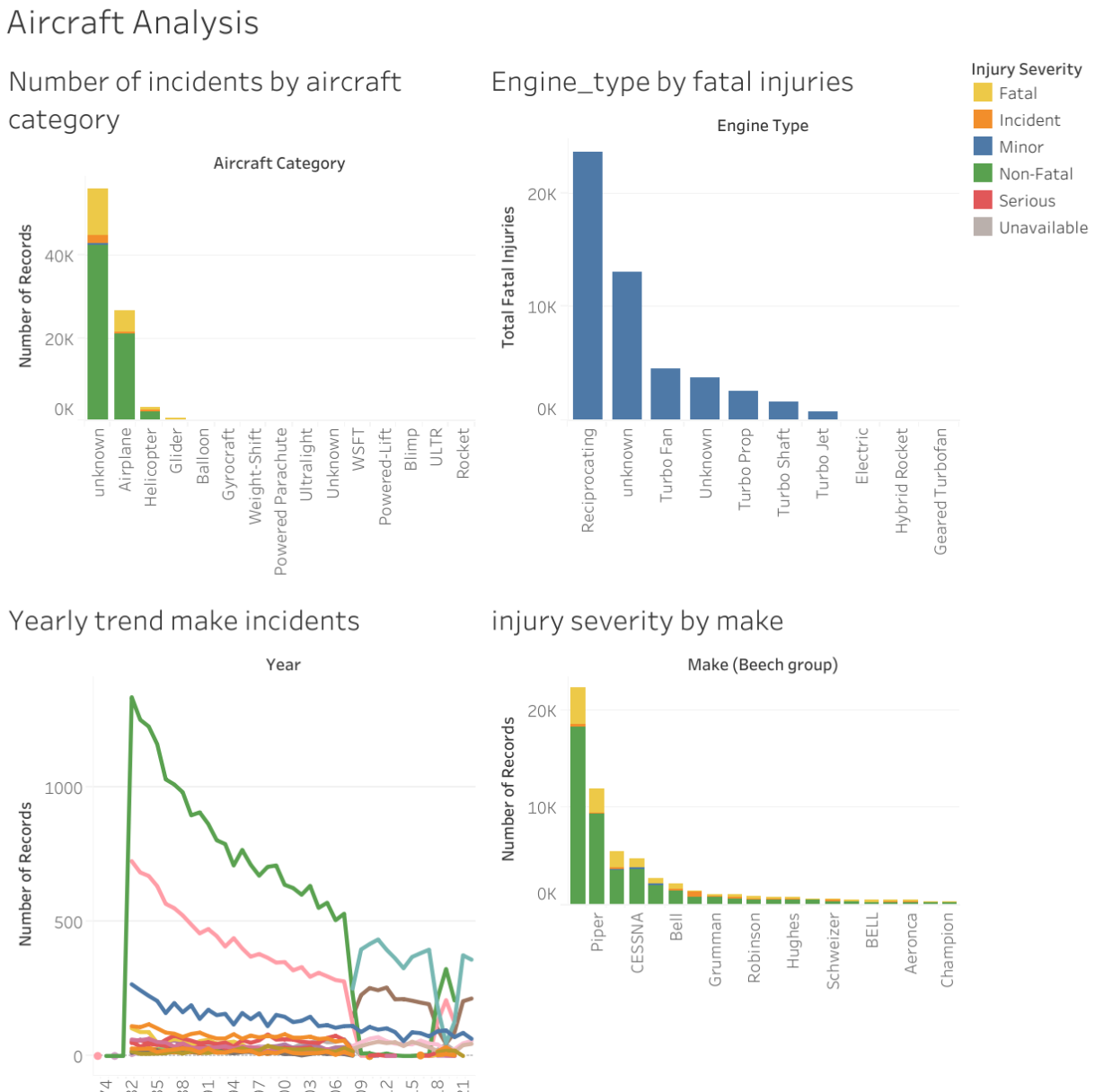
-The dashboard shows engine types and fatal categories ;this is essential in knowing the engines to go for saving on maintenance.
-Number of incidents by make aids in choosing the Make with the lowest risk .

-Yearly trends of each make for example Cessna shows a drop in numbers.

-Further analysis to determine why number in Cessna are reducing over the years..

-Piper and Cessna have higher fatal injuries in different weather conditions.

Reciprocating engine type records a higher ..

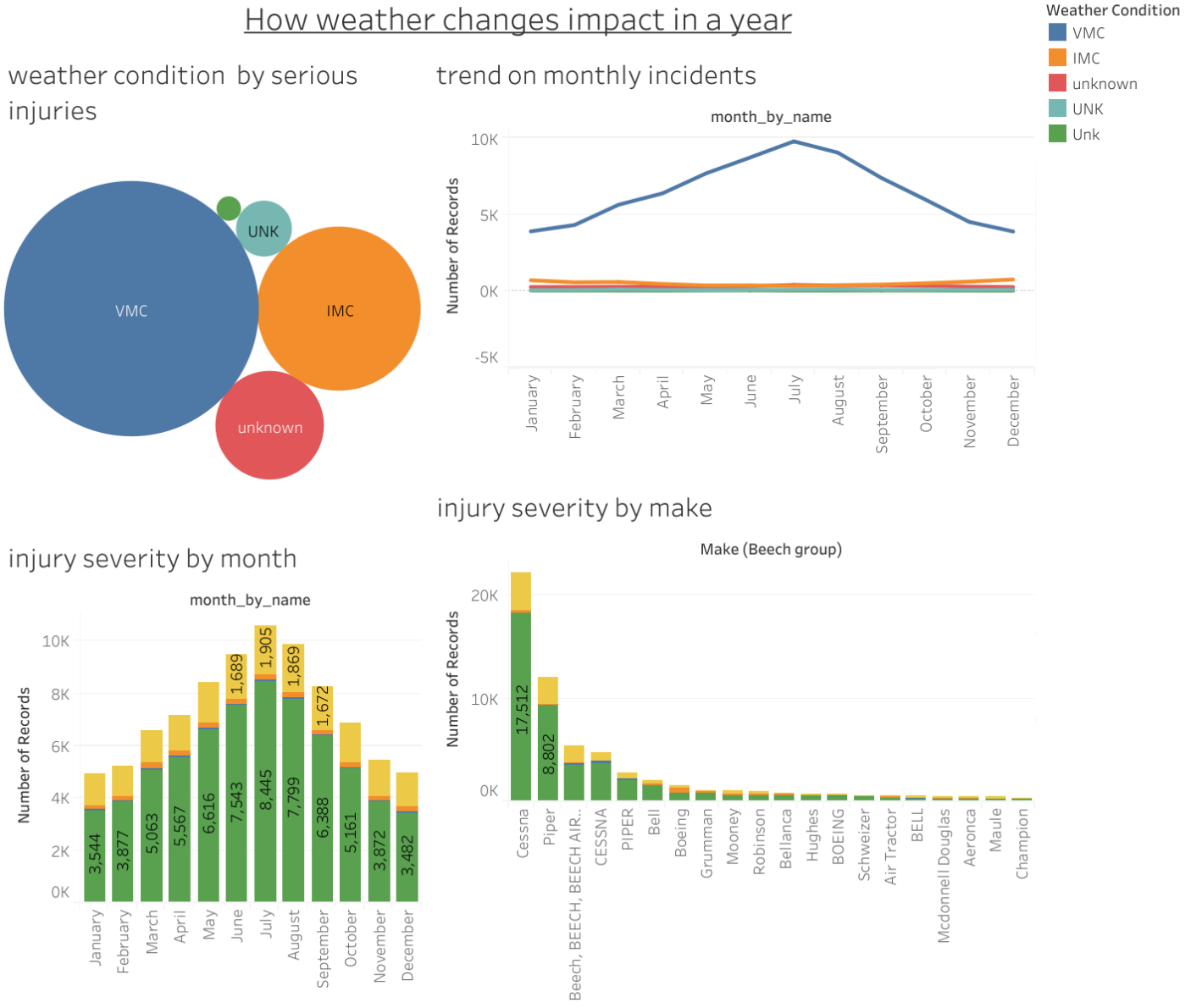


Risk trend over time

Variations in risk depends on various fa..

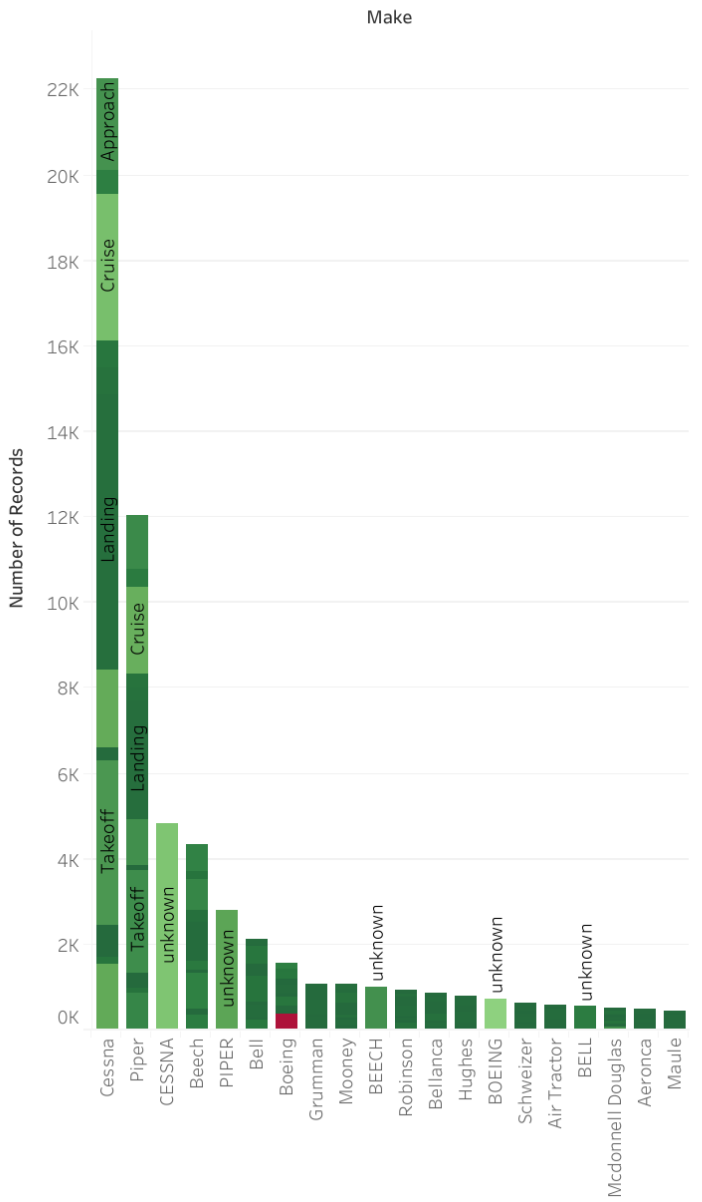
- During certain months like July we have higher recordings, also the VMC weather condition is high at this time.
- Considering the VMC and ICM ,the VMC has a lower number of fatal injuries .
- ICM weather condition rise from the month of July towards December ,this help schedule the flights across different months avoiding higher risk of fatal injuries and aircraft damage.

How weather changes impact in a year



Makes at different broad phase

When do most fatal injuries? occur?



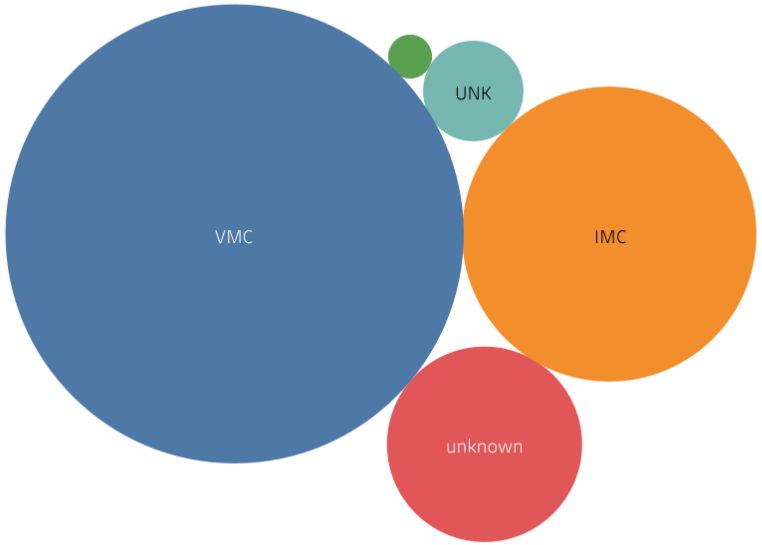
- Different makes experience risk at different broad of phase
- The Landing phase and Takeoff phase experience higher Fatal injuries rates.
- This indicates a lot of measure has to be taken during those phases.

VMC is at the top especilly in United st..

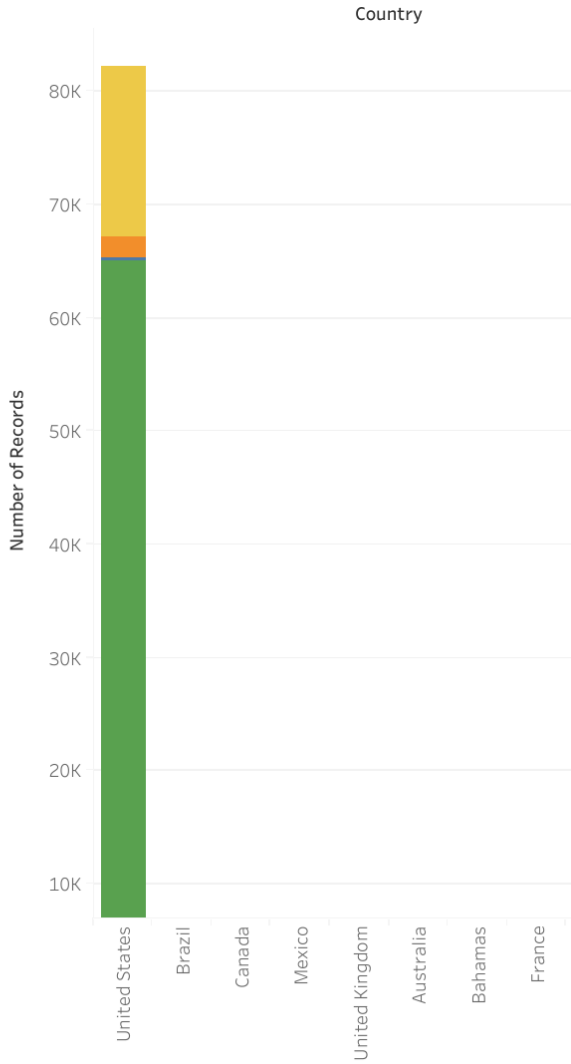
- Help understand weather patterns across different countries .
- This is essential especially when planning the routes to avoid fatal injuries
- United states has more incident compared to other countries

country and weather impact

weather condition by serious injuries



incidents in locations

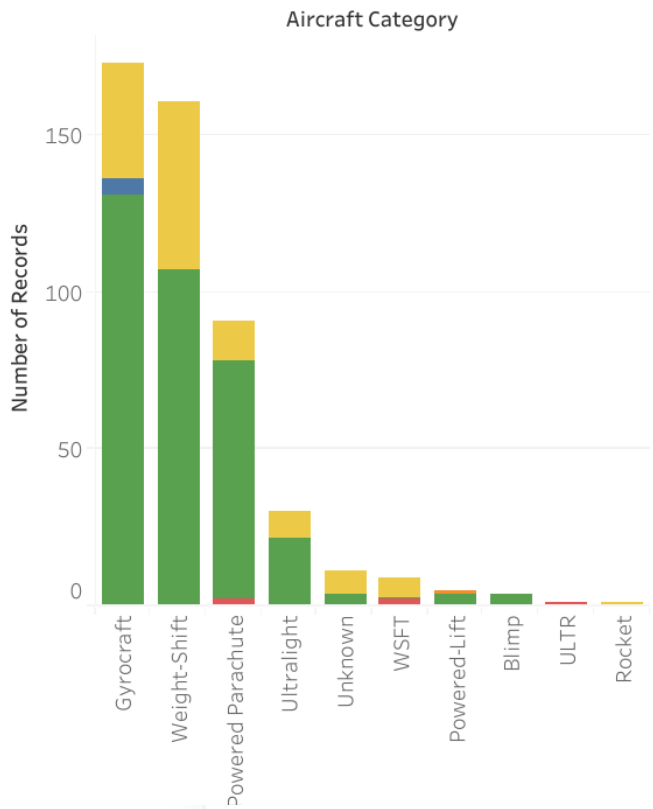


Risk variation by aircraft category

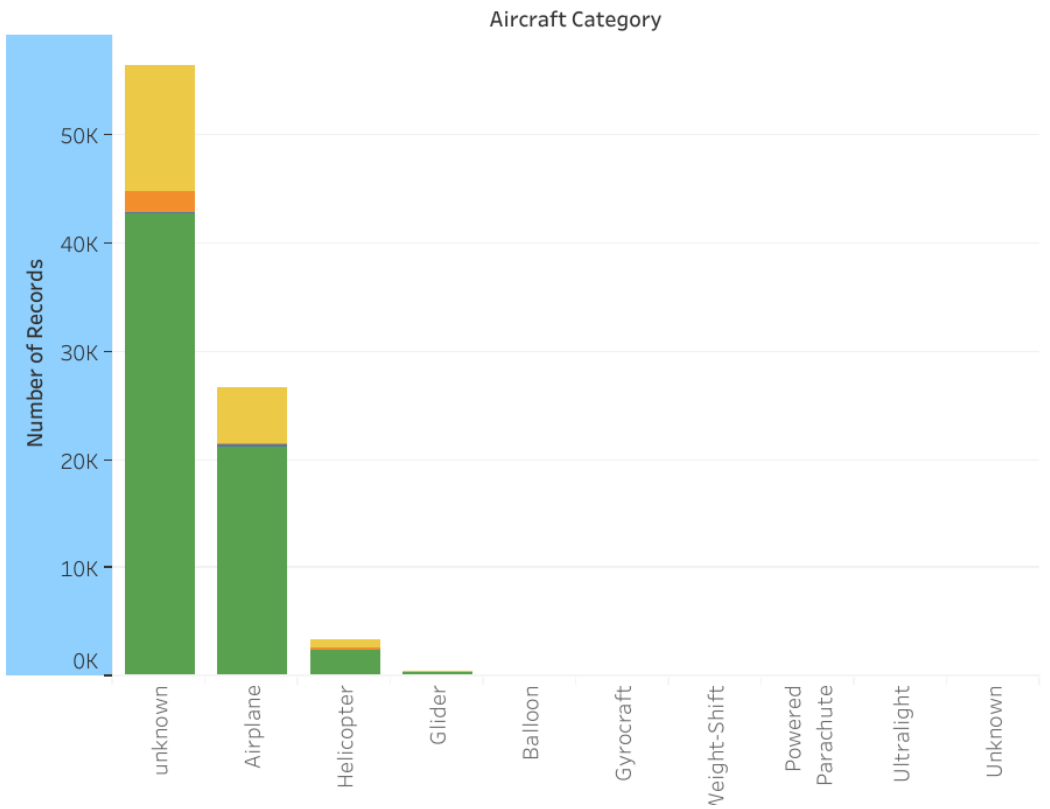
unknown and airplane have higher records c..

Highest and lowest aircraft category incident

Bottom 10 aircraft incident



Top 10 aircraft incident



- Top 10 categories have a higher number of incident.
  - example we have a higher number of unknowns and airplanes recording higher fatal injuries number.
- Bottom 10 show a lower number of incidents and fewer fatal injuries.
  - The ULTR and Rocket.
  - This help in prioritizing safer aircraft categories to purchase.

Recommendations

- Purchase aircrafts that have lower risk damage especially in ICM weather conditions.
- Invest in aircrafts with safer engine such as hybrid rocket. Caution be taken in reciprocating engine types.
- Prioritize makes with lower fatality such as(Robinson make)
- Go for aircraft categories with lower records of injuries such as ULTR keynote taken in airplane and unknown categories.
- Keep note of trend of makes over the years i.e. Cessna are declining over the years.
- Keep track of country weather conditions during different times of the year
- High precaution required during: Take-off, manoeuvring and Landing broad of flight phase.

Next Steps

- Check out the cost of various aircraft and their engine to know what aligns with your budget.
- Plan the locations or path of flight

- Any question or further explanation please reach out.

Thank You!