

# Aviation Data Analysis

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# Overview

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# Background

Your 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, but do not know anything about the potential risks of aircraft. You are charged with determining which aircraft are the lowest risk for the company to start this new business endeavor. You must then translate your findings into actionable insights that the head of the new aviation division can use to help decide which aircraft to purchase.

# Problem Statement

A company is expanding into the aviation industry by purchasing and operating aircraft for commercial and private enterprises. However, the leadership lacks knowledge about the potential risks. To ensure success, it is crucial to identify aircraft with the lowest risk. A detailed, data-driven assessment of different aircraft models is needed to help the aviation division make informed decisions aligned with the company's business goals.

# Key Questions

1. Which aircraft makes are associated with the fewest total injuries in recorded accidents?
2. What are the most common causes of aviation accidents?
3. Which regions are associated with higher risks?

# Data Understanding

Data from National Transportation Safety Board that includes aviation accident data from 1962 to 2023 about civil aviation accidents and in the United States.

Data cleaning using pandas

The following fields were used for analysis

- Aircraft Make

- Aircraft category

- Number of fatalities/injuries

- Weather Condition

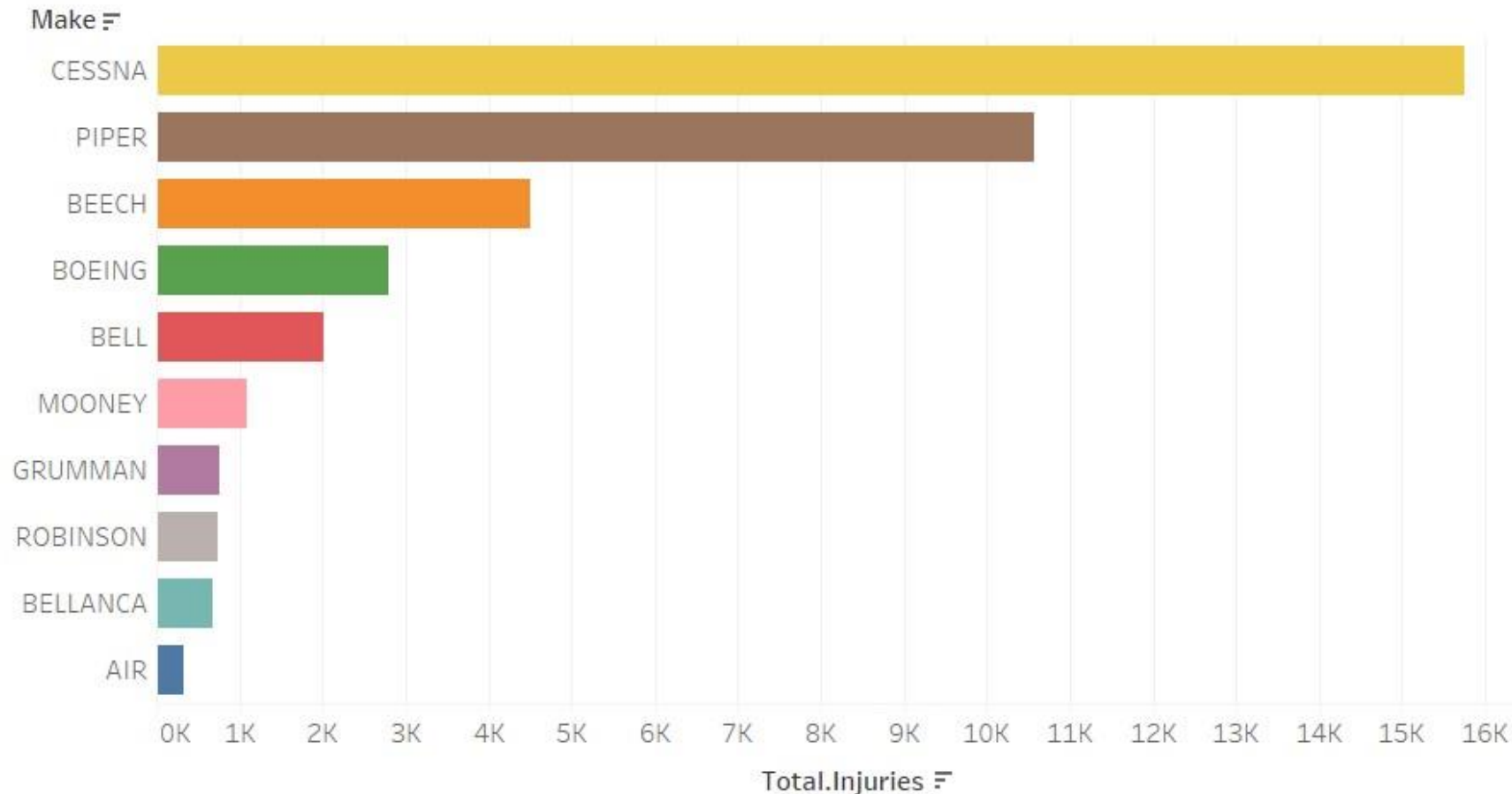
- Amateur Built

- Location(State)

- Purpose of flight

# Total Injuries by Make

Total Injuries by Make

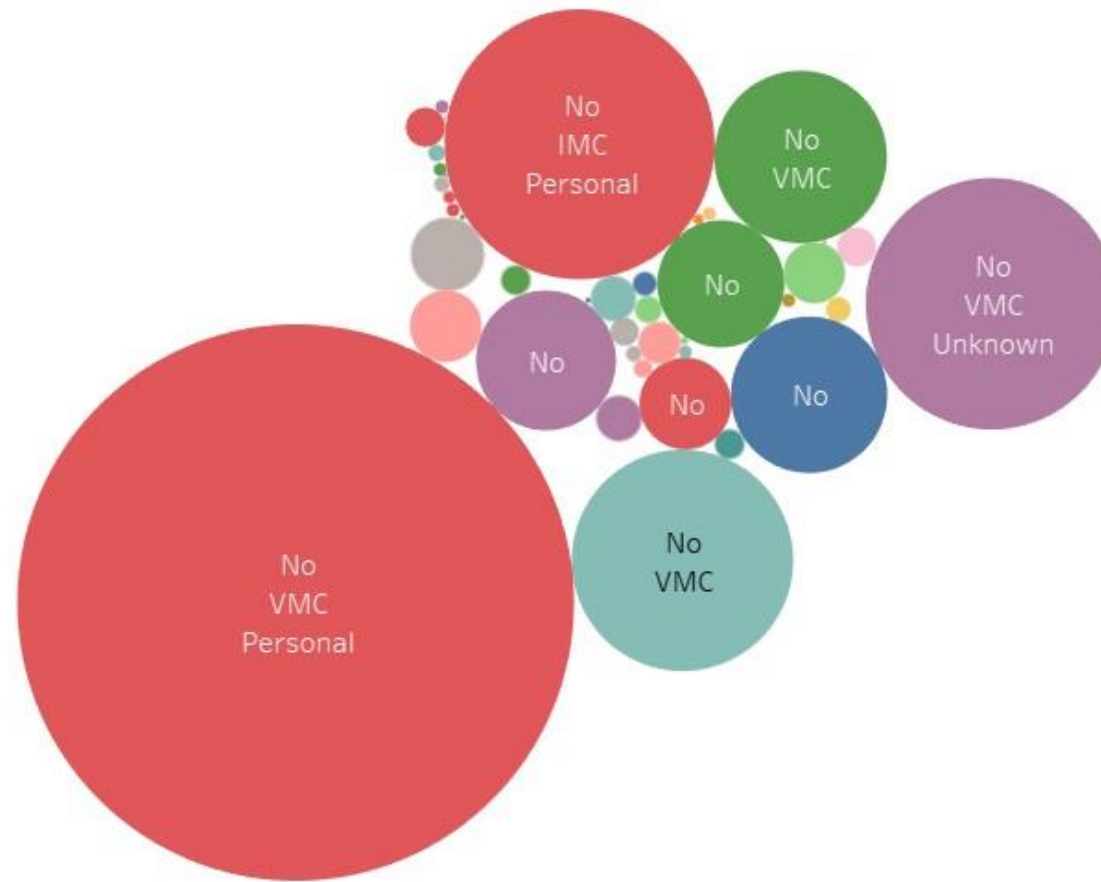


Make

AIR  
BEECH  
BELL  
BELLANCA  
BOEING  
CESSNA  
GRUMMAN  
MOONEY  
PIPER  
ROBINSON

# Aviation Accidents

### Weather Condition/Purpose of flight/Amateur Built against Total Injuries

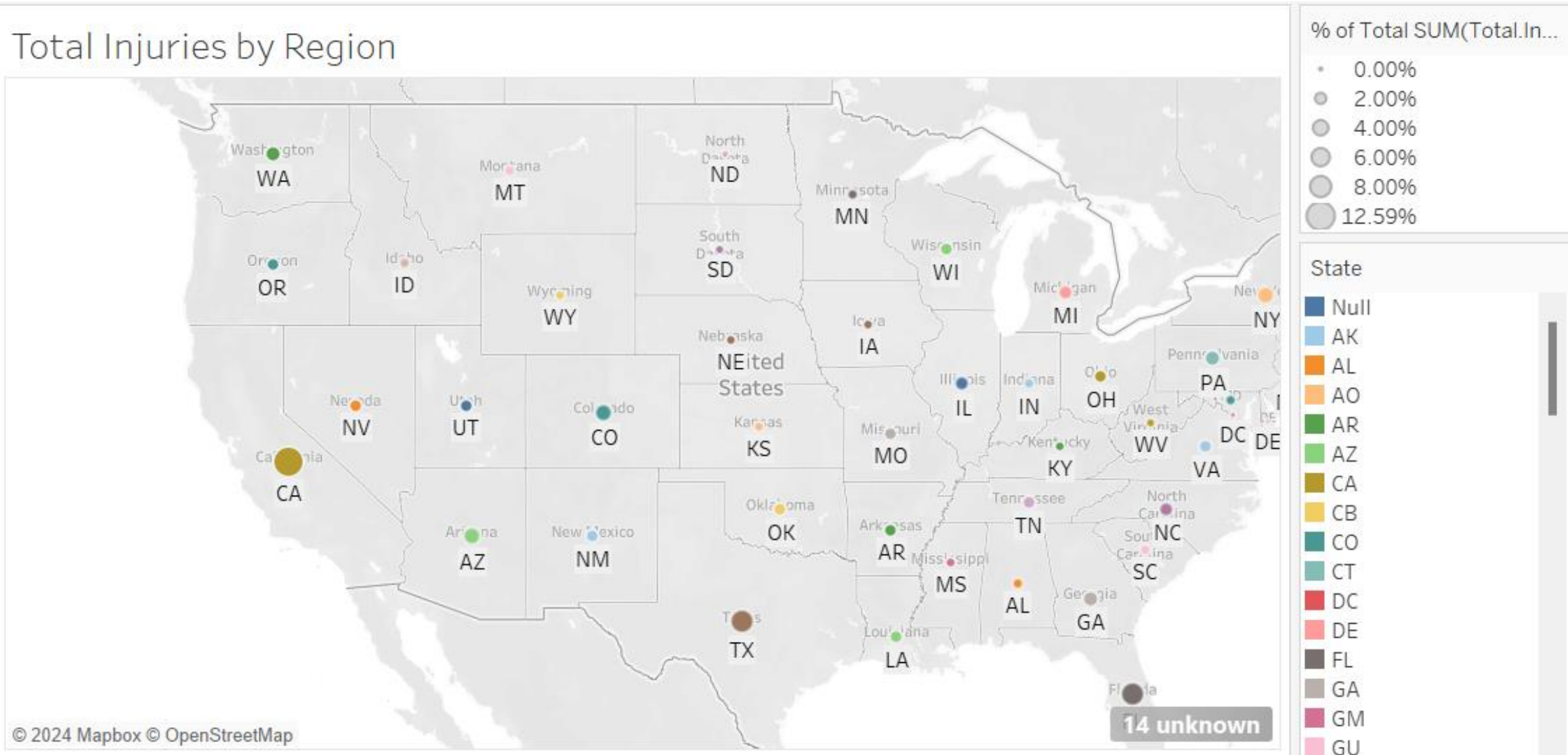


### Purpose of flight

- Aerial Observation
- Air Drop
- Air Race show
- ASHO
- Executive/corporate
- Ferry
- Firefighting
- Flight Test
- Glider Tow
- Instructional
- Personal
- Positioning
- Public
- Public Aircraft
- PUBS
- Skydiving
- Unknown



# Regions Associated with higher risks



# Key Findings

- ❖ Based on the analysis, Air, Bellanca, Robinson, Grumman and Mooney, aircraft makes show consistently lower injury rates compared to others
- ❖ Common causes:
  - Personal flights were observed to have higher injury rates followed by instructional flights.
  - A majority of accidents occur under Visual Meteorological Conditions (VMC) rather than Instrument Meteorological Conditions (IMC) or Unknown conditions.
- ❖ The geographical analysis of injury severity highlights states where aviation-related accidents and injuries are more frequent. Certain areas show higher injury rates, potentially due to environmental conditions, air traffic, or regulatory differences.

# Conclusions

1. Focus on Low-Injury Aircraft Makes
2. Establish advanced training programs for pilots and any personnel affiliated to the aviation industry
3. Operate in regions with lower accident and injury rates. Avoid high-risk states, and prioritize markets where the probability of injury is lower. This can lower maintenance costs, increase safety compliance, and provide a smoother entry into the aviation market.

# Recommendations

1. Choose safer aircraft models based on lower injury rates.
2. Implement safety measures targeting common causes of injuries (e.g., weather, mechanical issues).
3. Focus operations in regions with lower injury risks to minimize exposure to accidents.

**Thank You!**