AirCraft Risk Analysis

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Overview

The company is going to expand into new industries to diversify its portfolio, and they are interested in Aircraft, focusing on the purchasing and operating for commercial and private enterprises. This analysis is to look at the potential associated with aircraft in order to pinpoint the lowest risk for the company to start this new business endeavor.

Business Understanding and Goals

- We want to identify aircraft with the least risk to the company.
- This means we need to identify aircraft that has the lowest risk of accidents and failure.
- However, they are many factors that go into this including: The type of aircraft, its model, make, its air carrier, the weather and more.
- This will help the investors pick an aircraft with the least risk of damage and loss of investment.

Data Understanding

Data Source: Using data from Kaggle's Aviation Accident Database & Synopses, up to 2023. This has 2 datasets one with the aircraft data and another with states and abbreviations.

With information on the aircraft, possible causes of failure, carrier and location of the accident.

Data quality and limitations: The data has multiple missing values in it's the categorical columns.

```
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Data columns (total 31 columns):
 #   Column                  Non-Null Count  Dtype
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 0   Event.Id                88889 non-null  object
 1   Investigation.Type      88889 non-null  object
 2   Accident.Number         88889 non-null  object
 3   Event.Date              88889 non-null  object
 4   Location                88837 non-null  object
 5   Country                 88663 non-null  object
 6   Latitude                34382 non-null  object
 7   Longitude               34373 non-null  object
 8   Airport.Code            50132 non-null  object
 9   Airport.Name            52704 non-null  object
 10  Injury.Severity         87889 non-null  object
 11  Aircraft.damage         85695 non-null  object
 12  Aircraft.Category       32287 non-null  object
 13  Registration.Number     87507 non-null  object
 14  Make                    88826 non-null  object
 15  Model                   88797 non-null  object
 16  Amateur.Built           88787 non-null  object
```

```
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Data columns (total 2 columns):
 #   Column        Non-Null Count  Dtype
---  ------        --------------  -----
 0   US_State      62 non-null     object
 1   Abbreviation  62 non-null     object
dtypes: object(2)
memory usage: 1.1+ KB
```

Data Understanding

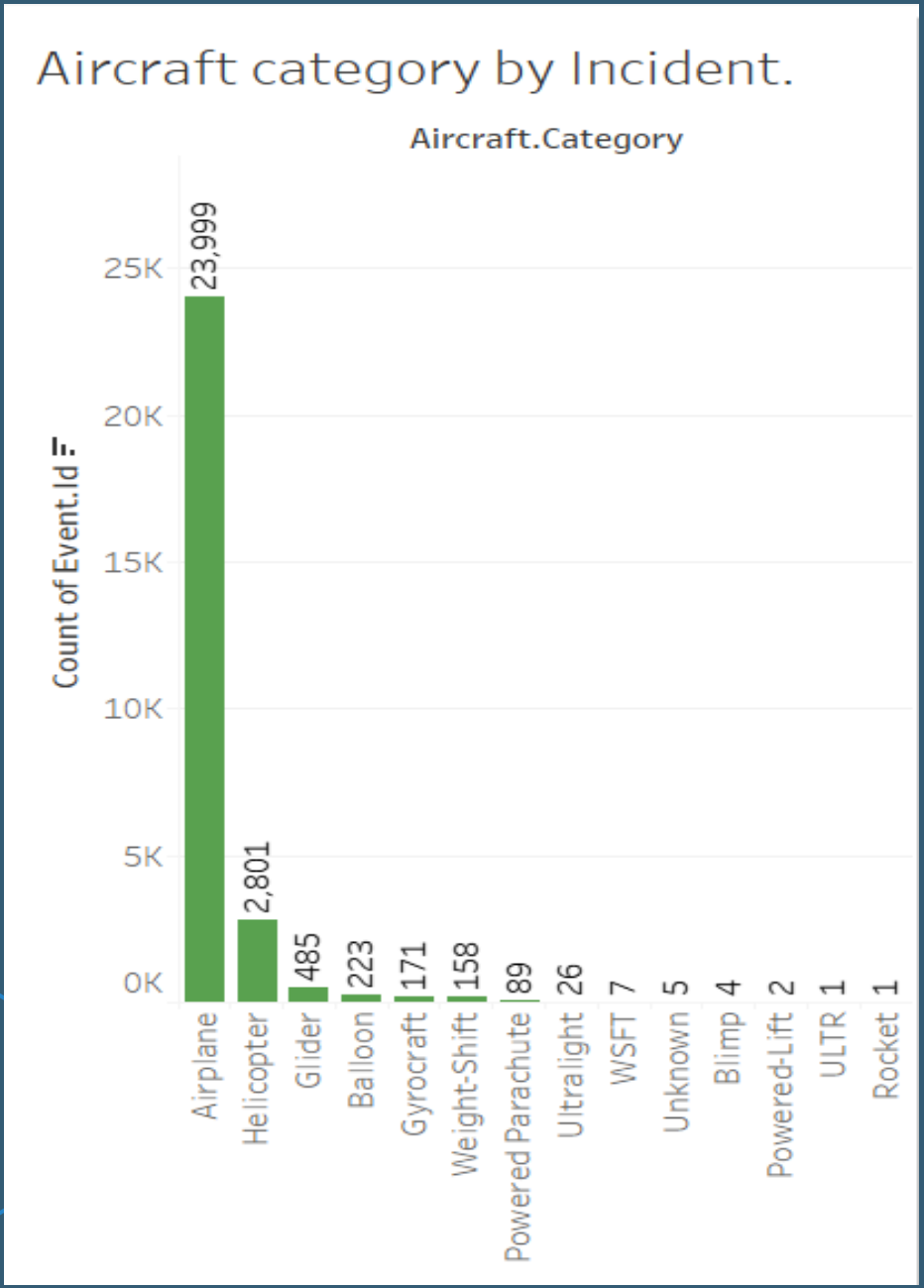
Descriptive statistics on numerical columns:

We note from the descriptive statistics that the max number of engines is 8, however, the average is 1. This could depend of use of the aircraft or even load which could affect its performance.

The max number of Fatal injuries is 349 but on average it is 0.64. This shows the majority of Aircraft is safe with only injuries ranging from 0.64 at Fatal to 0.35 at Minor.

The average number of Uninjured is much higher than that of the Injuries and therefore we can assume that Aircraft in general is considered to be a safe form of travel and good for the company.

	Number.of.Engines	Total.Fatal.Injuries	Total.Serious.Injuries	Total.Minor.Injuries	Total.Uninjured
count	82805.000000	77488.000000	76379.000000	76956.000000	82977.000000
mean	1.146585	0.647855	0.279881	0.357061	5.325440
std	0.446510	5.485960	1.544084	2.235625	27.913634
min	0.000000	0.000000	0.000000	0.000000	0.000000
25%	1.000000	0.000000	0.000000	0.000000	0.000000
50%	1.000000	0.000000	0.000000	0.000000	1.000000
75%	1.000000	0.000000	0.000000	0.000000	2.000000
max	8.000000	349.000000	161.000000	380.000000	699.000000



Data Analysis

As shown the aircraft with the highest amount of risk due to incident is the Airplane with 23999.

Second only to the helicopter, at 2801. This means that the most risky aircraft in the industry is the airplane even more so than the rocket which is the least.

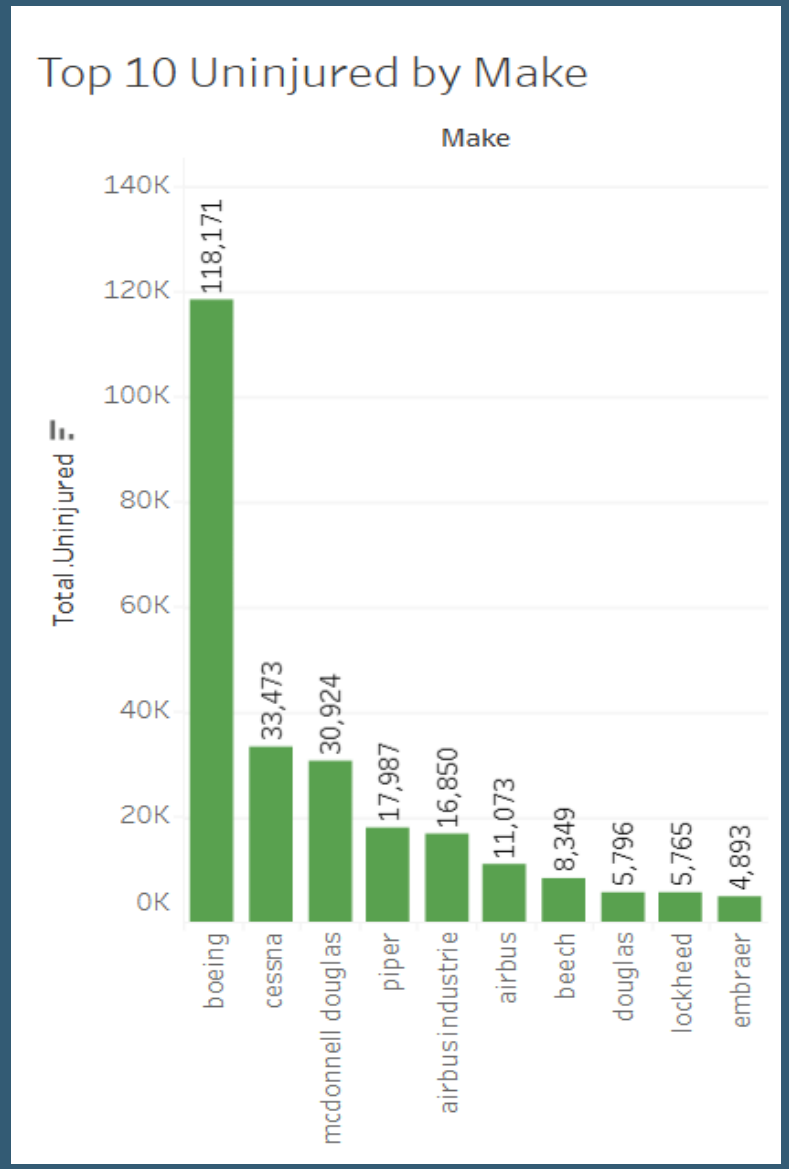
This also means that it is likely to be the most frequently used aircraft.

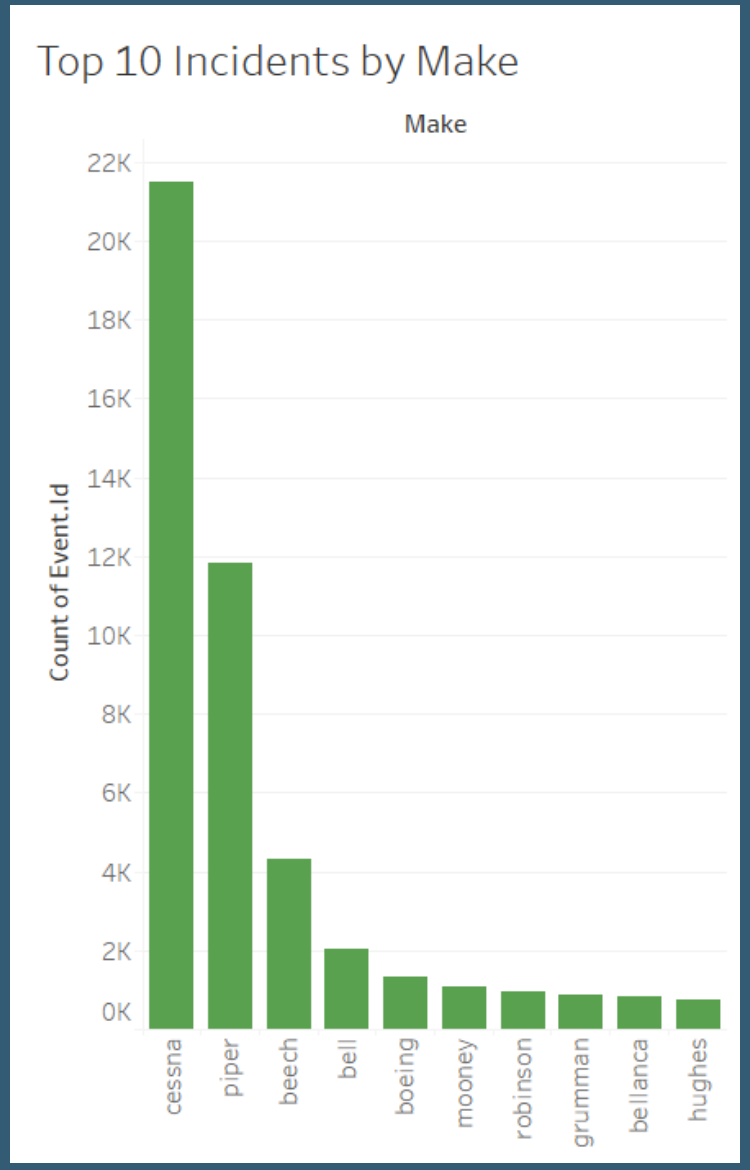
Data Analysis

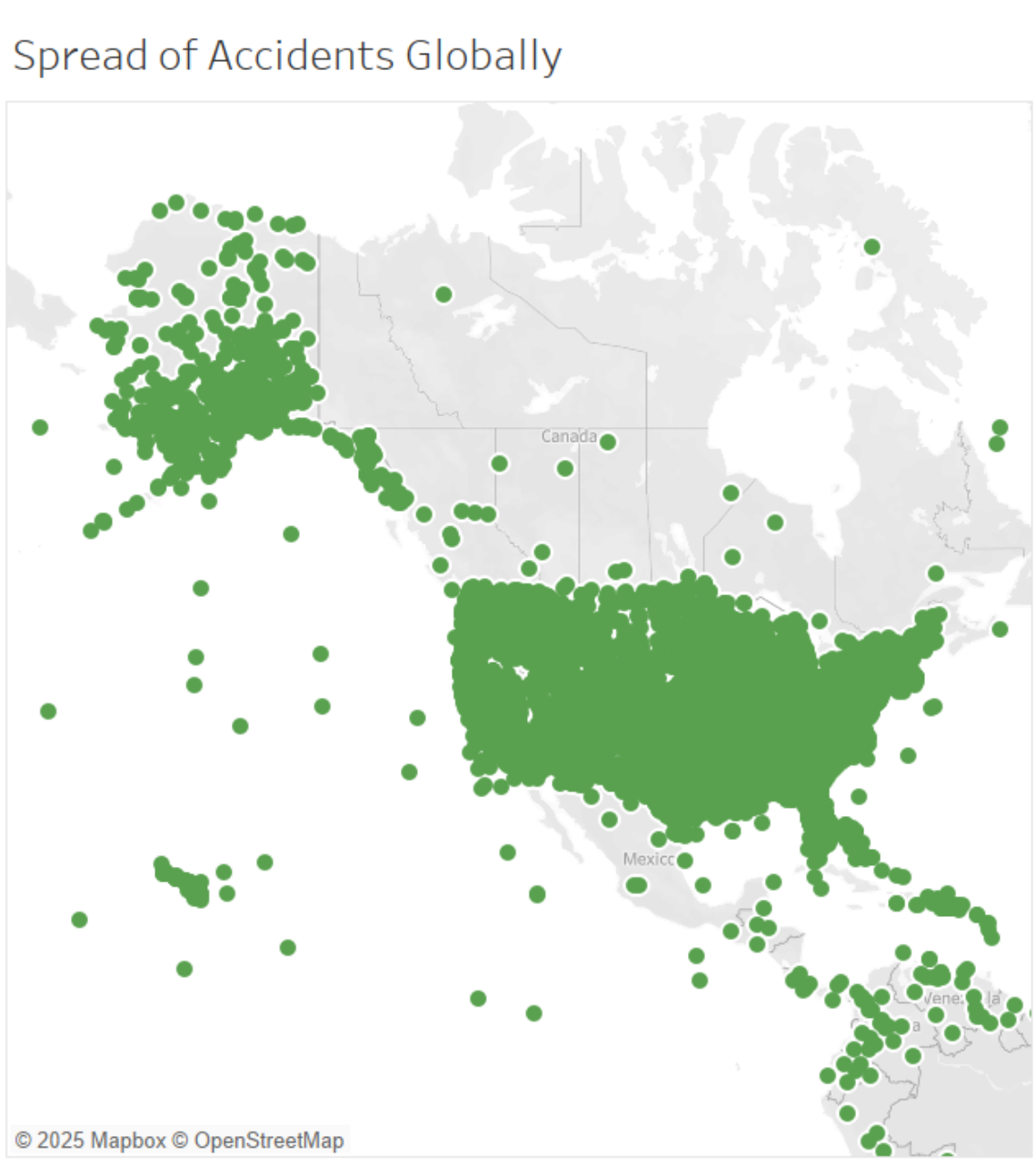
Looking at the top 10 incidents and the total number of uninjured by Make.

We can see that the highest number of incidents are seen by the Aircraft make **Cessna** this means they have a history of creating aircraft that has a high number of accidents and incidents.

The highest number of Uninjured by Make is Boeing , this shows that although they are listed to have a high number of incidents, they also create strong planes that can leave a large number of survivors and therefore is less risky.

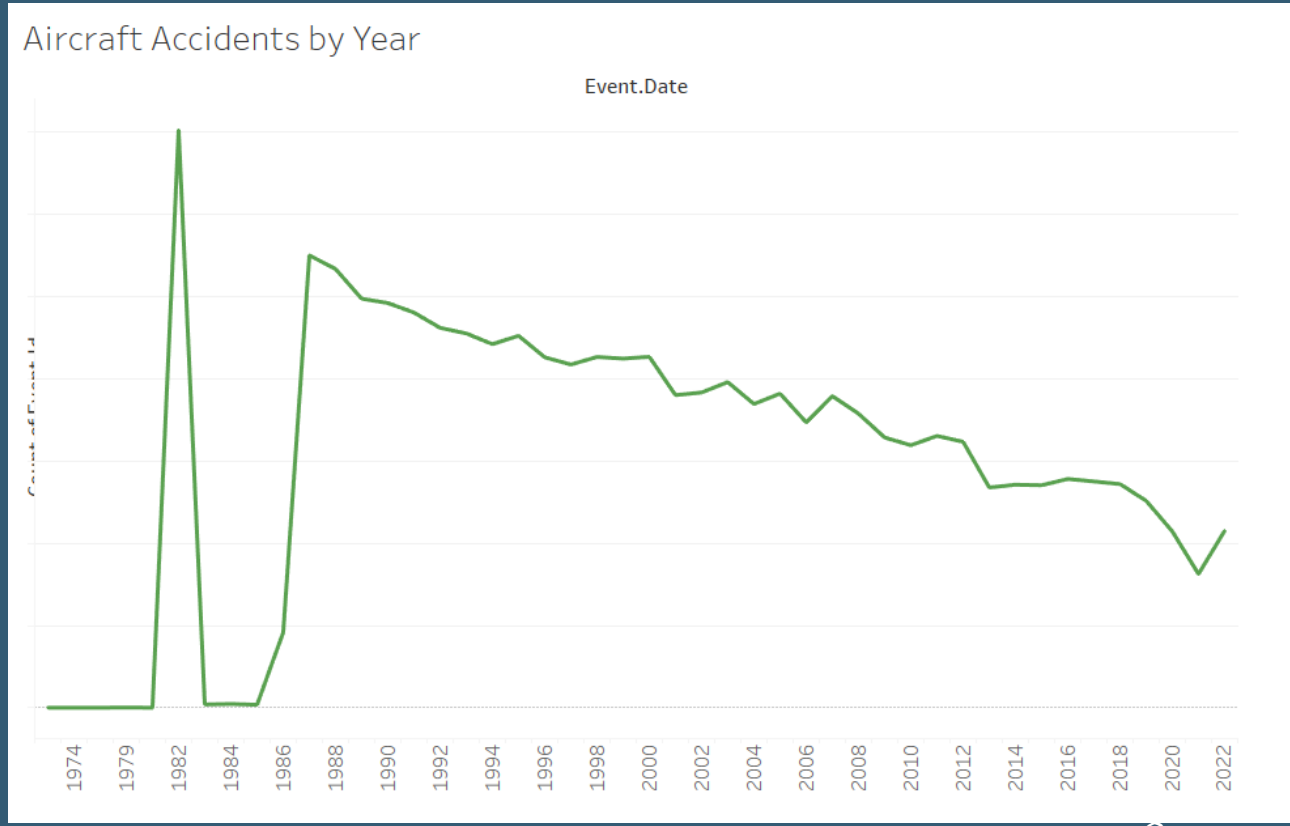






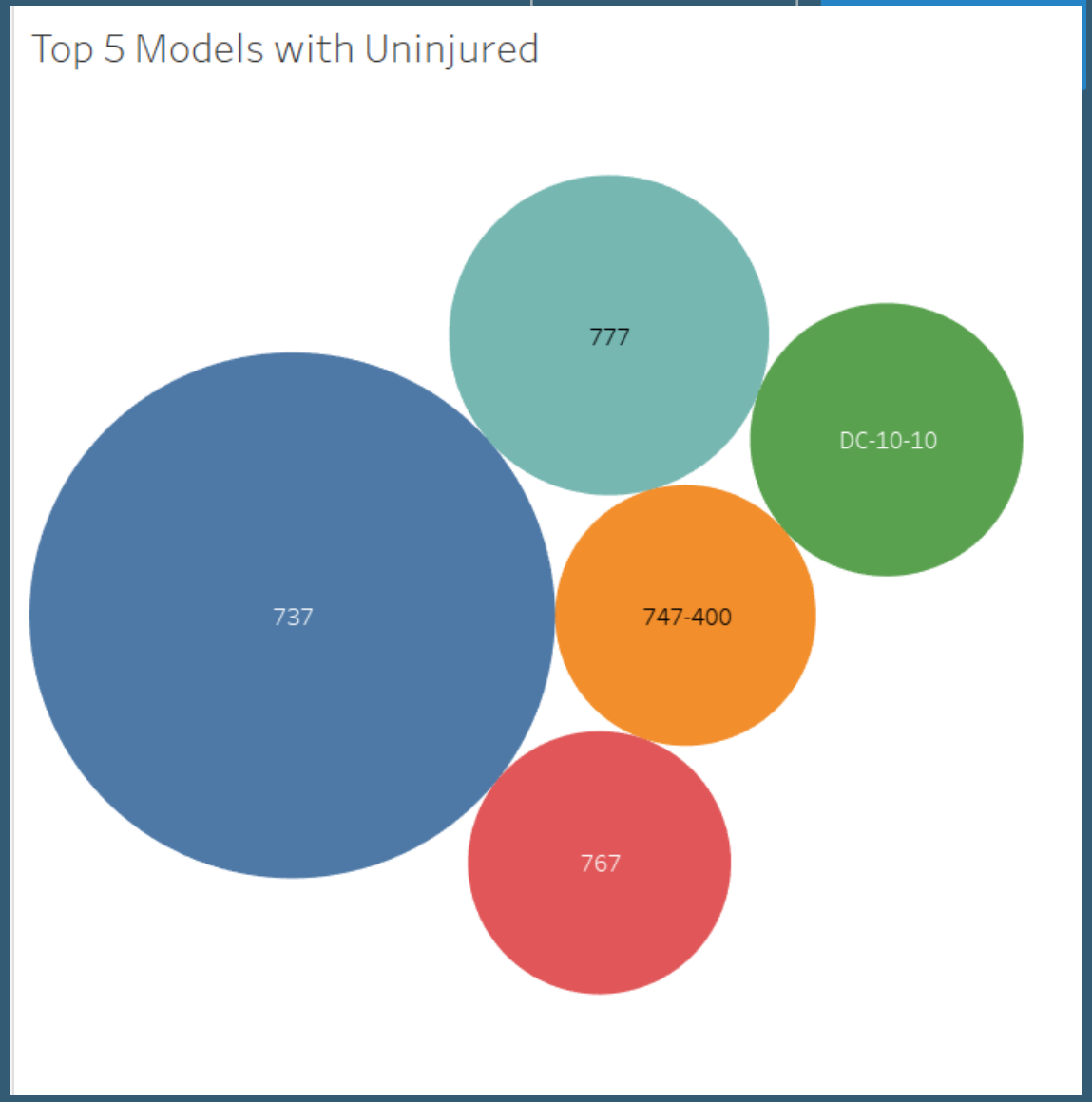
When looking at the spread the majority if aircraft incidents are located in the USA and if the company is located here further research on the causes will need to be established.

When looking at the year you will notice that the number of accidents has reduced overtime showing that safety measure in aircraft has increased.



Answer

When looking at specifically airplane and filtering for the h Airplane the boeing 737-732 has the highest number of uninjured and so it is considered to be the strongest airplane in the business and therefore the lest risky.



Recommendations

1. If possible, more away from airplanes are they are found to have the highest number of aircraft accidents.
2. Boeing is considered to have the highest number if uninjured in the industry and so investing in their aircraft is recommended. Specifically, the boeing 737-732 .
3. The number of aircraft related accidents has reduced over time indicating that aircraft regulations and machinery has become less risky and safer to invest in so the company can focus on aircraft as planned.
4. Further research is needed to identify why the USA has the highest number of aircraft accidents especially if they are located as company in the country

Next Steps

- Look into models under Boeing and locate the preferred model that is available .
- Research into company needs ; what exactly is the aircraft to be used for whether commercially, personal, business/ executive or cargo as this will largely influence the model selection.
- Look into pricing dependent on model and if possible to rent the required aircraft.

Thank you

Any Questions?