Identifying Low-Risk Aircraft for Aviation Expansion

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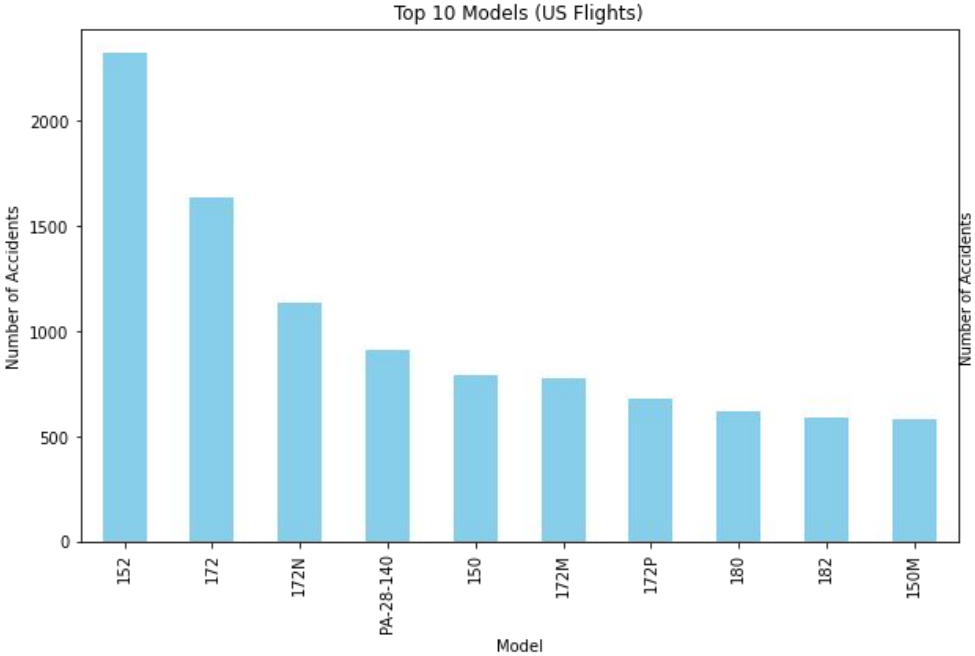
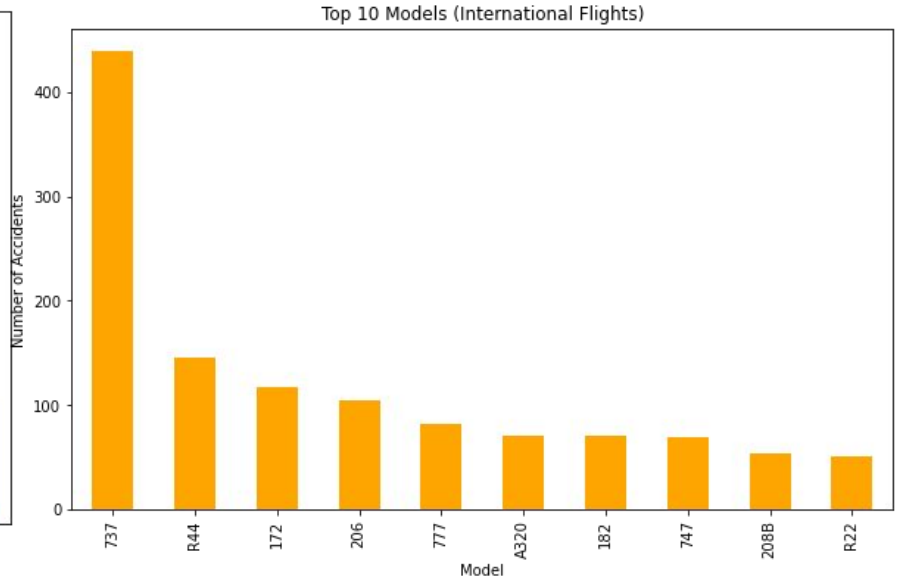
Business Understanding

Objective: Identify low-risk aircraft models and operational strategies to support the company's entry into the aviation sector.

Key Deliverables:

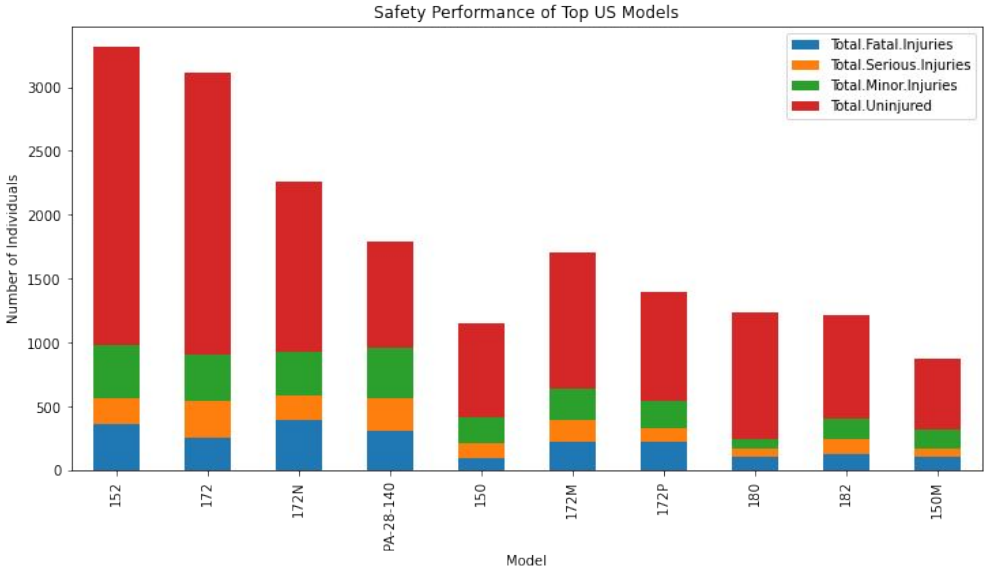
1. Recommendations for low-risk aircraft for US and international operations.
2. Insights into operational risks (e.g., flight phases, weather conditions).
3. Strategic guidance for improving safety in operations globally.


Top 10 Models (US Flights)
Number of Accidents
0
500
1000
1500
2000
152
172
172N
PA-28-140
150
172M
172P
180
182
150M
Model


Top 10 Models (International Flights)
Number of Accidents
0
100
200
300
400
737
R44
172
206
777
A320
182
747
208B
R22
Model

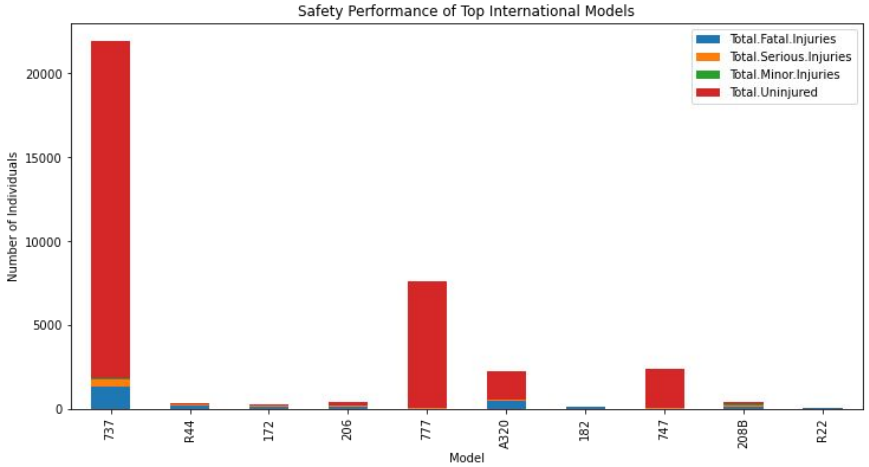
Aircraft Model Safety Analysis

U.S **Key Finding**: Cessna 172M and 172 are the safest models for domestic operations.



International **Key Finding**:

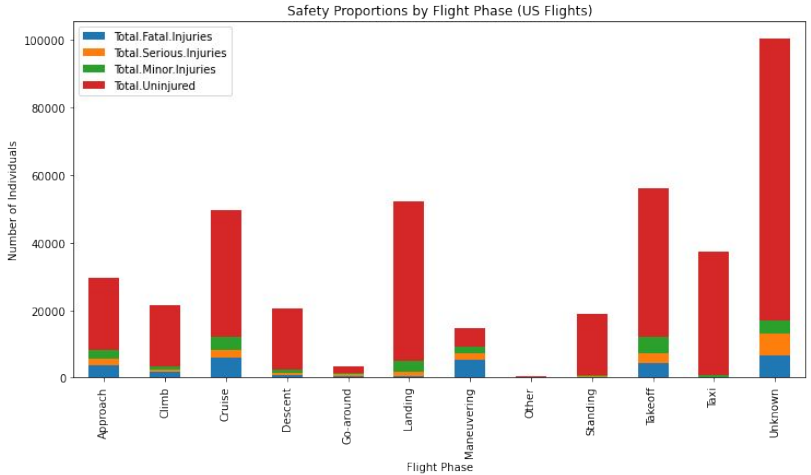
- Boeing 737 is safest under VMC.
- Boeing 777 is optimal for IMC conditions.



Flight Phase Risks

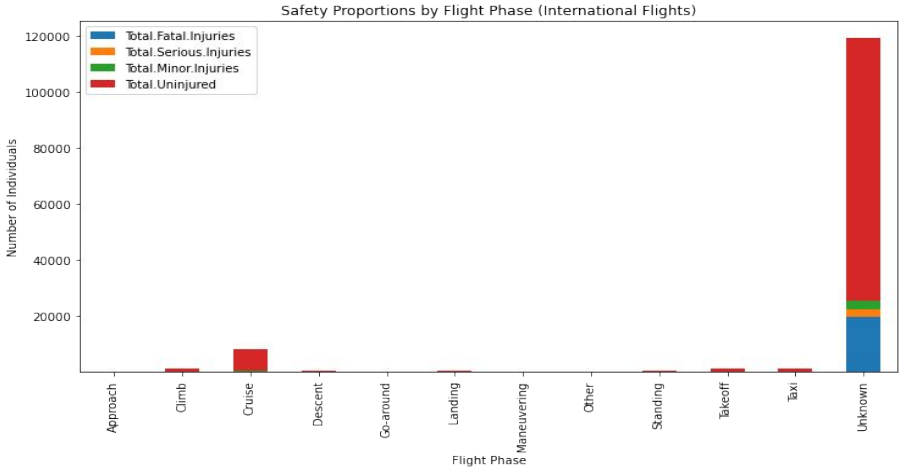
US Flights:

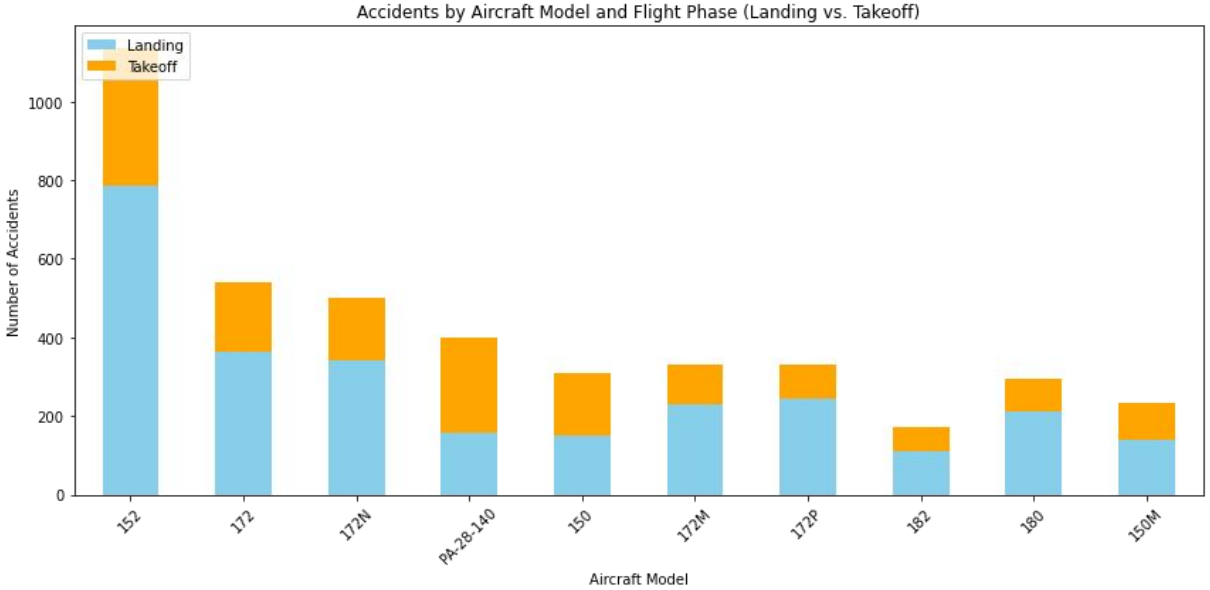
- Landing and takeoff are the most accident-prone phases.
- Cruise-phase accidents are rarer but more severe.



International Flights:

- Majority of accidents occur during cruise, with higher severity under unknown conditions.





Landing: The majority of accidents occur during the landing phase .**Cessna 172M** consistently exhibits higher uninjured proportions compared to other top models during landing.

Takeoff: Takeoff is also a high-risk phase, but accidents here tend to be less frequent compared to landing. **Cessna 172P** shows strong safety performance in takeoff-related accidents.

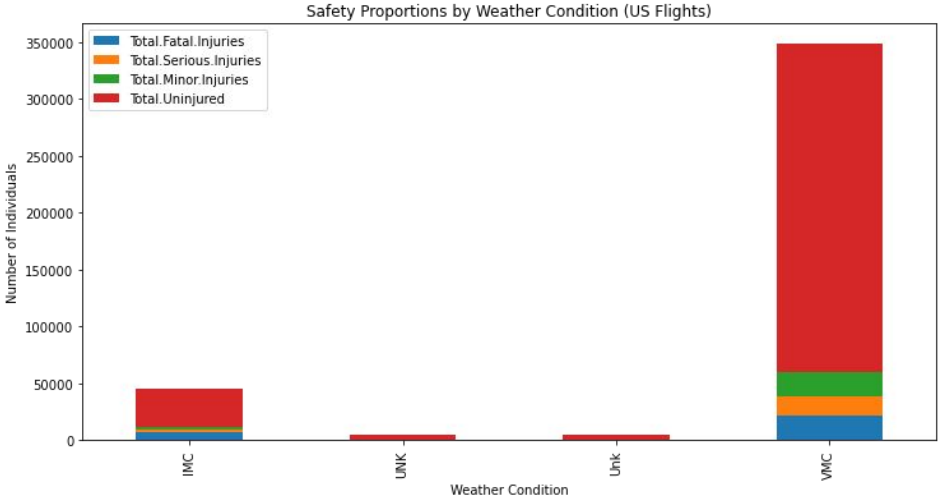
Implications

- Training programs and safety protocols should prioritize landing and takeoff operations.
- Models like **Cessna 172M** and **Cessna 172P** can be recommended for their reliability during critical phases.

Weather Conditions

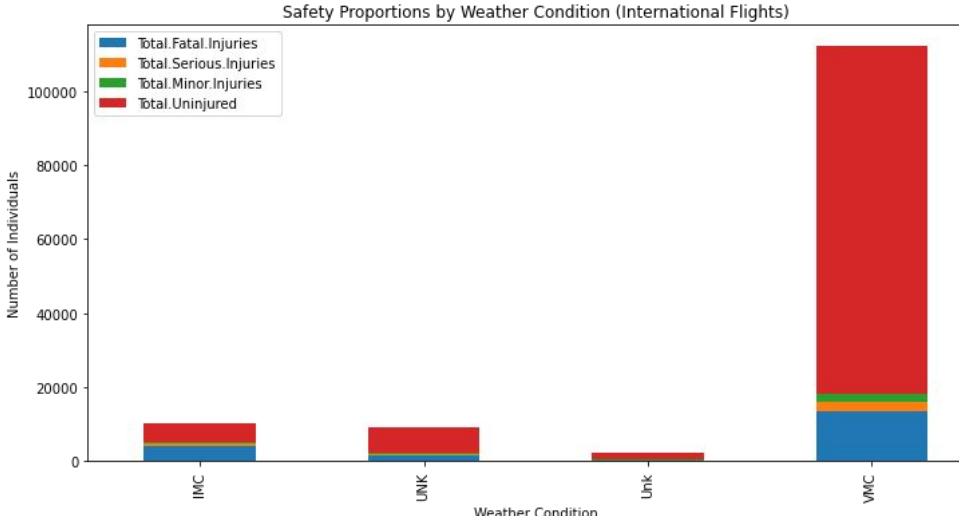
U.S **Key Insights**:

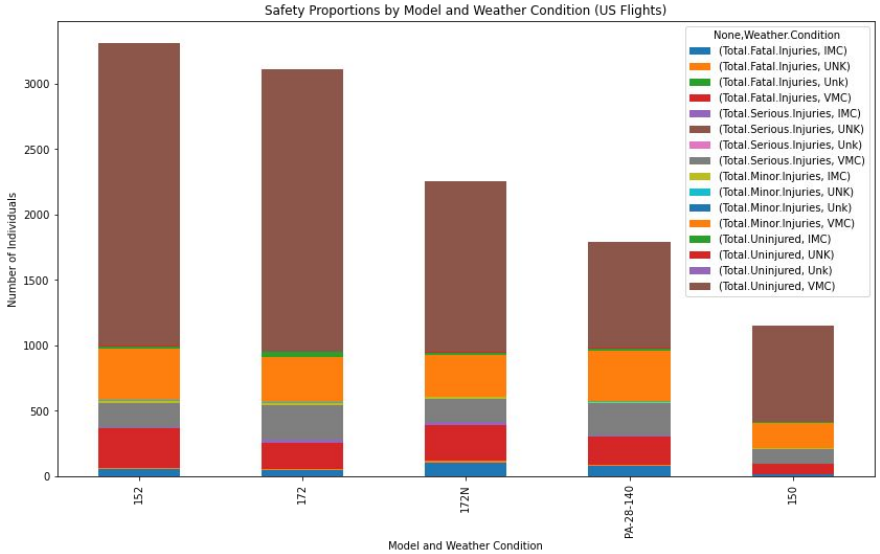
- Most accidents occur under VMC.
- IMC accidents are less frequent but more severe.
- Cessna 172M and 172 demonstrate safety across weather conditions.

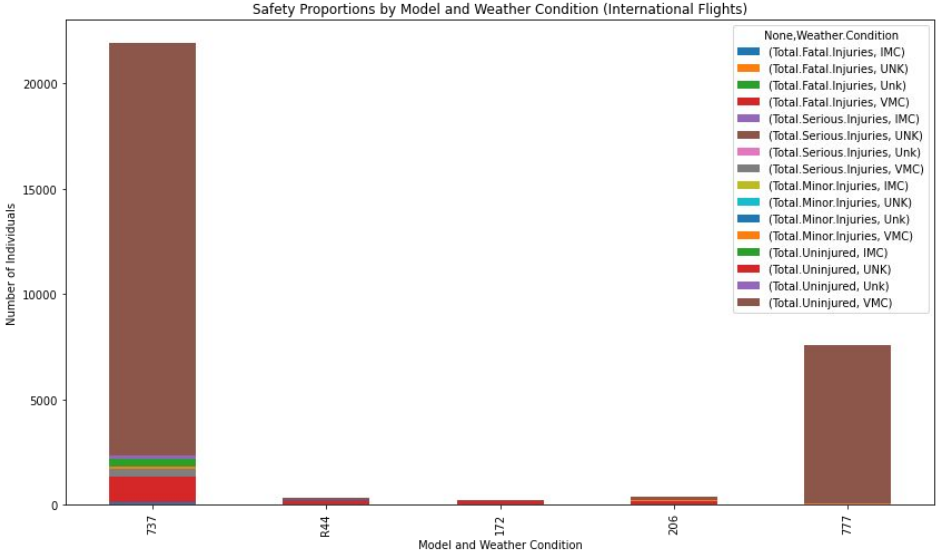


International **Key Insights**:

- VMC accounts for most accidents.
- Boeing 737 performs well in VMC; Boeing 777 excels in IMC.




Safety Proportions by Model and Weather Condition (US Flights)
Number of Individuals
Model and Weather Condition
152
172
172N
PA-28-140
150
None,Weather.Condition
(Total.Fatal.Injuries, IMC)
(Total.Fatal.Injuries, UNK)
(Total.Fatal.Injuries, Unk)
(Total.Fatal.Injuries, VMC)
(Total.Serious.Injuries, IMC)
(Total.Serious.Injuries, UNK)
(Total.Serious.Injuries, Unk)
(Total.Serious.Injuries, VMC)
(Total.Minor.Injuries, IMC)
(Total.Minor.Injuries, UNK)
(Total.Minor.Injuries, Unk)
(Total.Minor.Injuries, VMC)
(Total.Uninjured, IMC)
(Total.Uninjured, UNK)
(Total.Uninjured, Unk)
(Total.Uninjured, VMC)


Safety Proportions by Model and Weather Condition (International Flights)
Number of Individuals
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R44
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None,Weather.Condition
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(Total.Serious.Injuries, UNK)
(Total.Serious.Injuries, Unk)
(Total.Serious.Injuries, VMC)
(Total.Minor.Injuries, IMC)
(Total.Minor.Injuries, UNK)
(Total.Minor.Injuries, Unk)
(Total.Minor.Injuries, VMC)
(Total.Uninjured, IMC)
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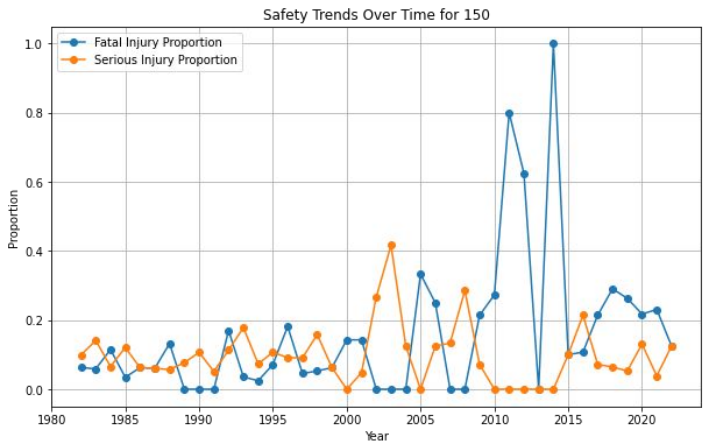
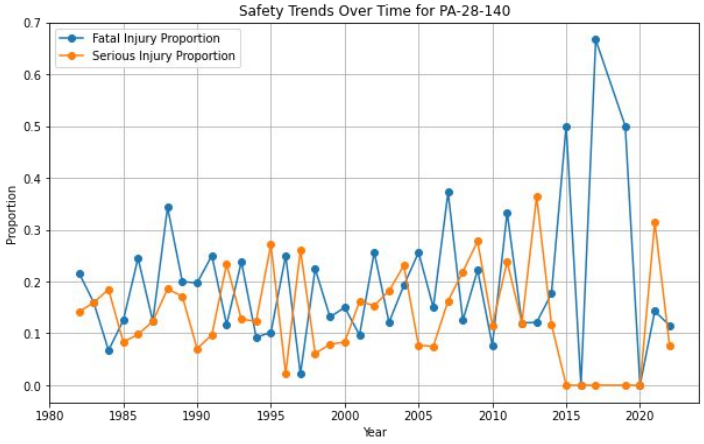
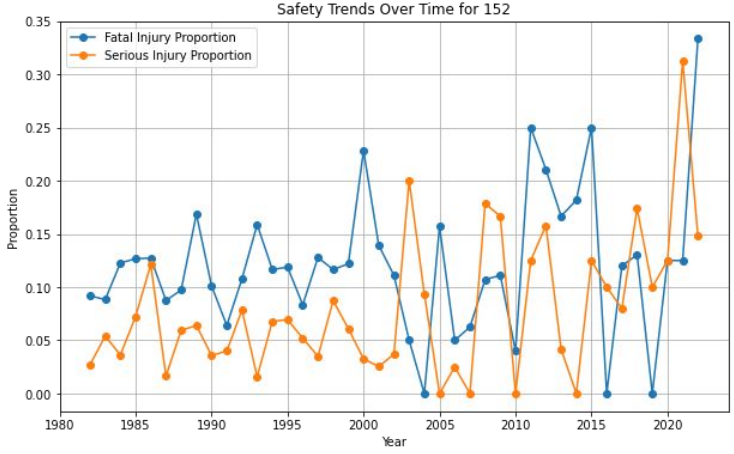
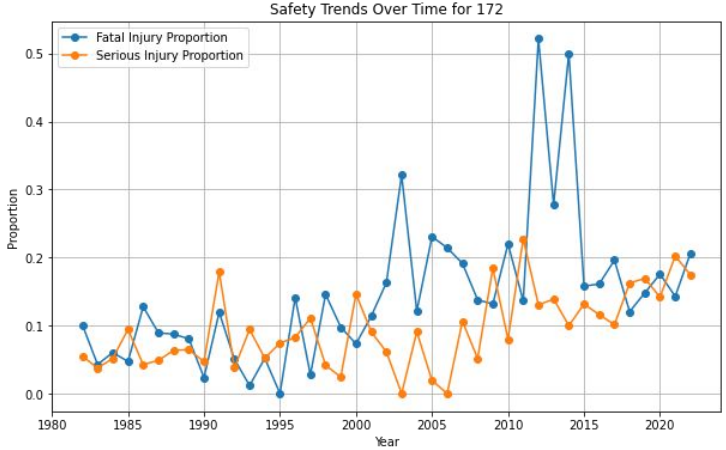

Safety Trends Over Time for 150
Fatal Injury Proportion
Serious Injury Proportion
Proportion
Year


Safety Trends Over Time for PA-28-140
Fatal Injury Proportion
Serious Injury Proportion
Proportion
Year


Safety Trends Over Time for 152
Fatal Injury Proportion
Serious Injury Proportion
Proportion
Year


Safety Trends Over Time for 172
Fatal Injury Proportion
Serious Injury Proportion
Proportion
Year

Model Trends Over Time

U.S **Key Models**: Cessna 150, 152, 172, and PA-28-140.

- **Findings**:
  - Most models show steady or declining serious/fatal injury proportions over time.
  - Spikes in some years indicate operational or external factors.

International **Key Models**: Boeing 737 and 777.

- **Findings**:
  - Boeing 777 shows improving safety in IMC.
  - Boeing 737 maintains consistent safety in VMC.

Recommendations and Next Steps

For US Flights:

1. Prioritize Cessna 172M and 172 for their superior safety performance.
2. Invest in IMC-specific training and technology to address weather-related risks.
3. Monitor higher-risk models (e.g., Cessna 150) for operational improvements.

For International Flights:

1. Utilize Boeing 737 for VMC operations and Boeing 777 for IMC.
2. Focus on mitigating risks during cruise phase.
3. Develop global training for weather resilience and operational safety.

Next Steps

Next Steps

- Expand analysis to include newer aircraft models and maintenance data.
- Investigate pilot error trends to develop comprehensive safety strategies.