

AVIATION INCIDENT ANALYSIS: KEY INSIGHTS FOR SAFER OPERATIONS

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Outline

- Business context
- Data description
- Data process steps
- Results
- Conclusion
- Recommendations

Business context

Aviation incidents carry high human and financial costs. As such, regulators and operators require clear, data-driven insights to target safety improvements where they matter most.

This analysis thus highlights patterns in aircraft types, operator fatalities and damage severity to guide effective interventions.

Data description

Our dataset comprised **1,250 aviation incident records** 1,250 aviation incident records

Cleaning steps were applied:

- Damage codes were standardized into clear categories (Write-Off, Substantial, Minor, No Damage).
- Duplicate records and redundant columns were removed.
- Key fields were renamed for clarity.
- Dates and fatalities were converted to correct formats.

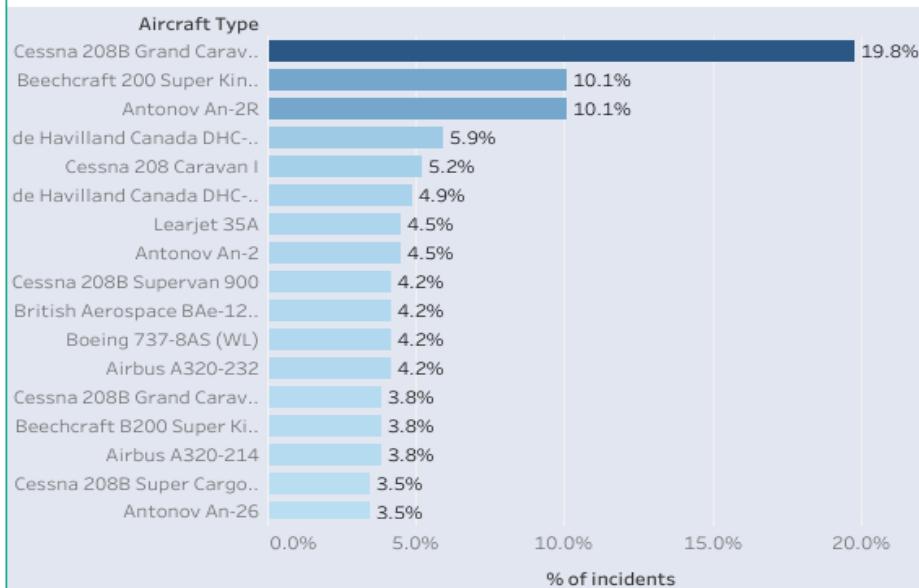
Data processing steps

The process followed three steps



Result

Proportion of Aircraft Types involved in aviation incidents



Operators with > 30 Fatalities



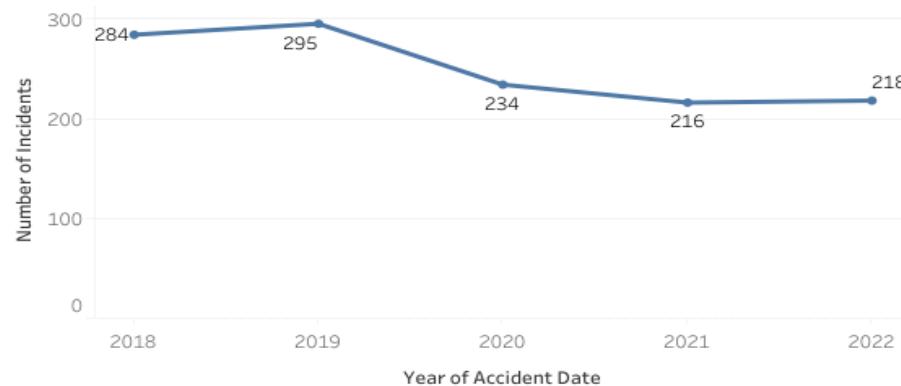
Fatalities vs Severity of damage



Result:

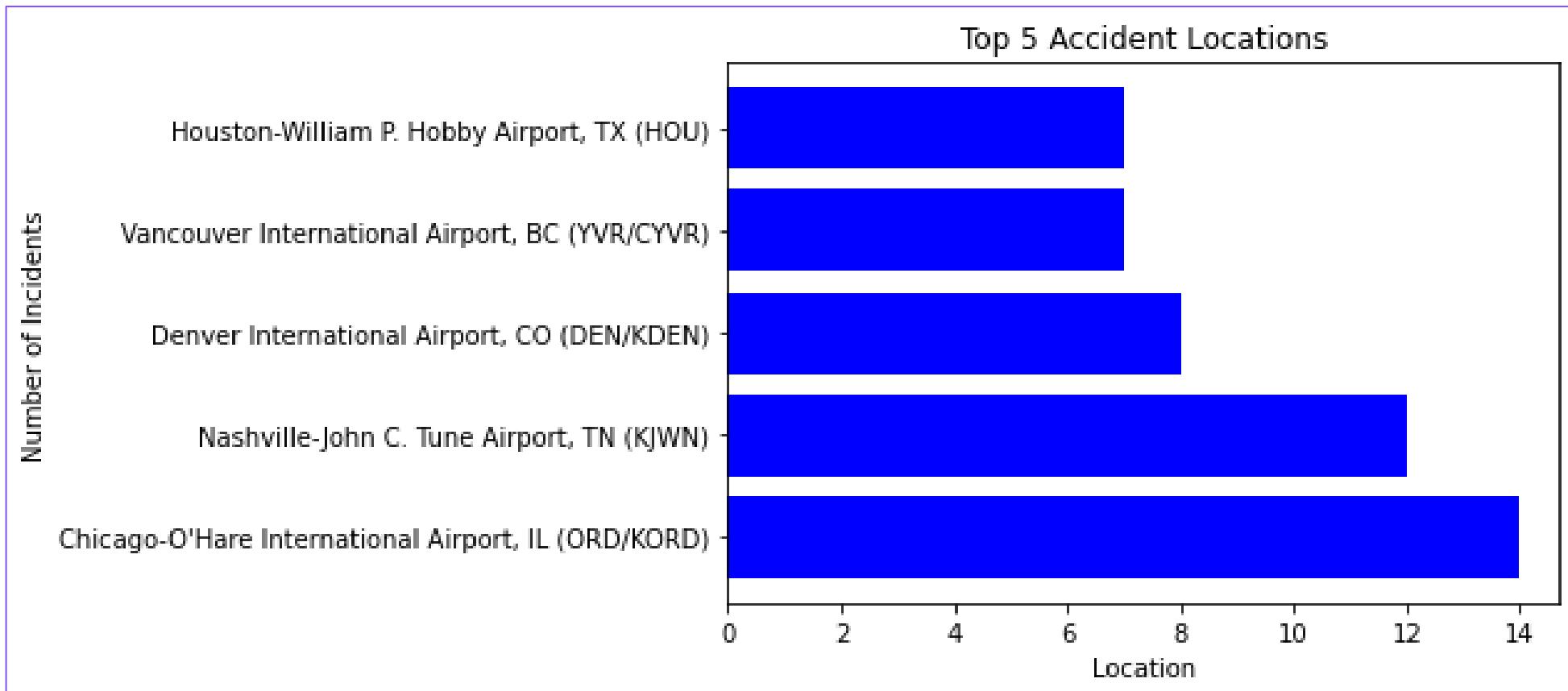
- Three aircraft such as Cessna 208B Grand Caravan, Al Quwwat al-Jawwiya al-Iraqiya and Lion Air account for over 30% of the aircraft accidents.
- 97% of all fatalities (2,238 of 2,301) occur in write-off cases, underscoring that severe damage drives risk, ..

Trend Analysis of Incidents



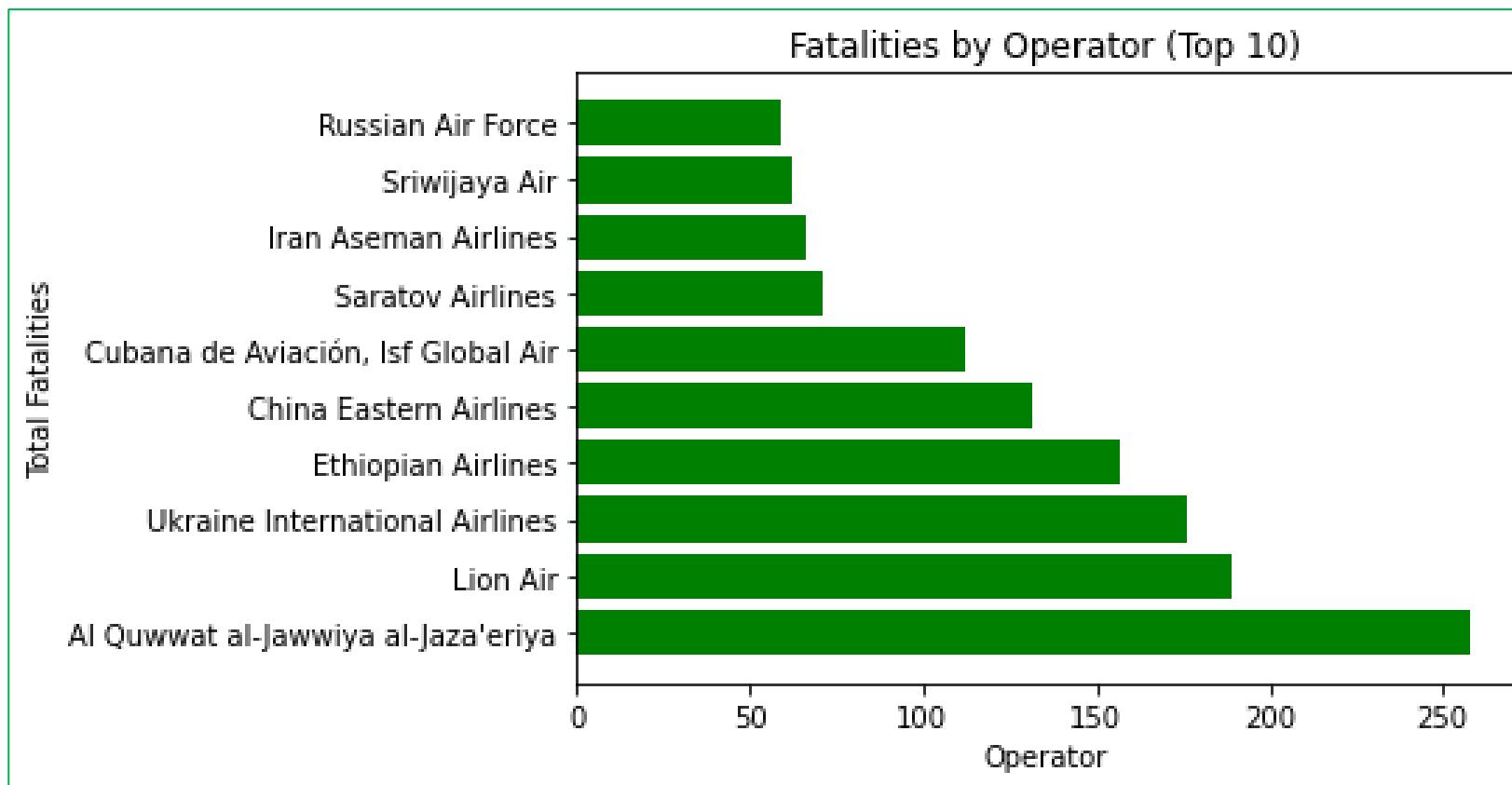
Result

Only five aircraft types account for the majority of incidents, suggesting that widely used models concentrate risk exposure.



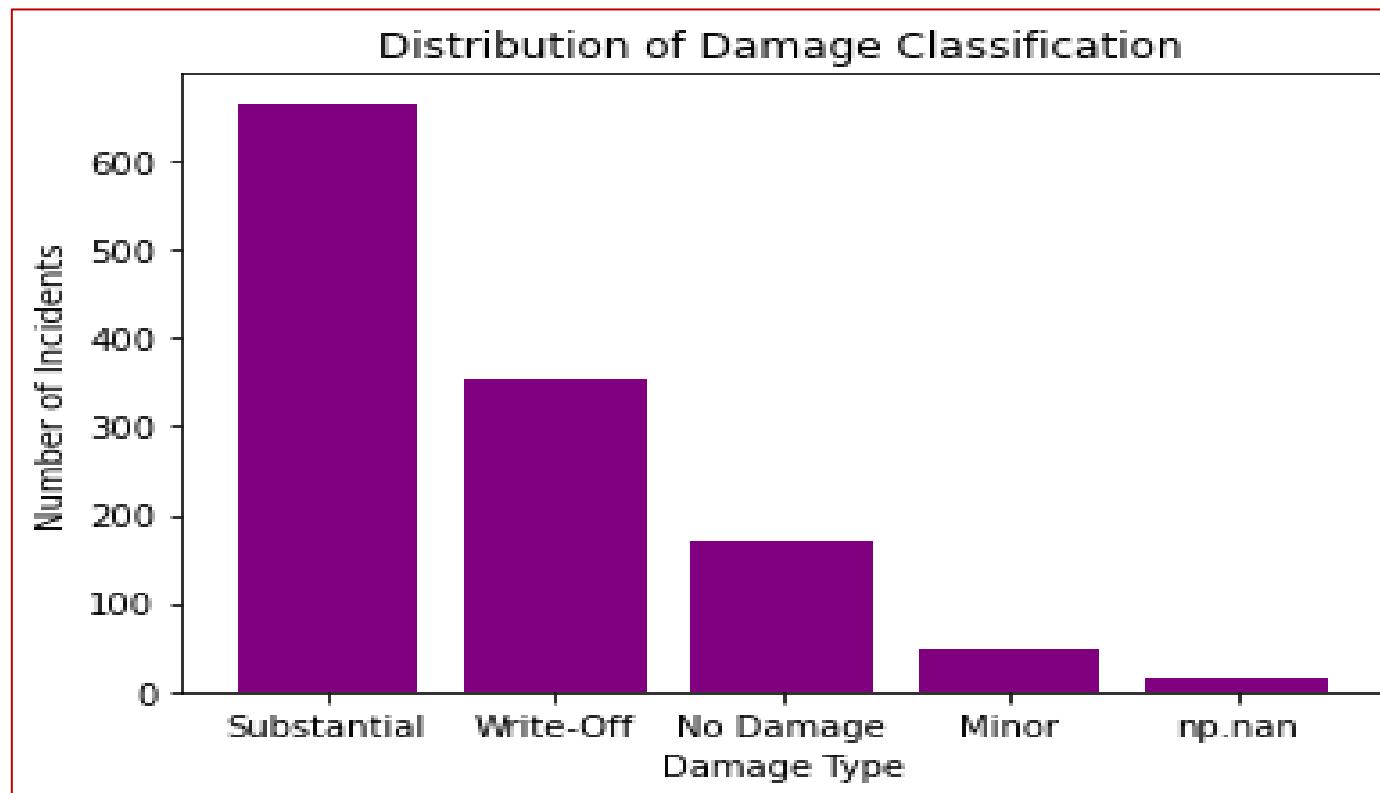
Result

Fatalities are disproportionately concentrated among a small number of operators. This indicates that targeted safety audits and operator-specific interventions could significantly reduce overall risk



Result

Severe damage categories (Write-Off and Substantial) dominate the dataset. Critically, 97% of fatalities occur in write-off incidents



Conclusion

From the analysis it is observed that;

- Incident reporting is concentrated among a handful of aircraft types.
- A few operators account for most fatalities.
- Severe damage categories drive nearly all fatal outcomes.
- Missing or inconsistent data highlights the need for stronger reporting standards.

Recommendations

- There is need to investigate high-incident aircraft types to distinguish between usage volume and design vulnerabilities.
- Conduct operator specific audits targeting those with disproportionate fatalities.
- Strengthen reporting standards to reduce missing or unknown classifications.



Questions



Thank you

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