

Aviation Safety Analysis for Fleet Procurement


DATA-DRIVEN RECOMMENDATIONS

overview

- ▶ This dashboard explores historical aircraft accident data to identify recurring patterns, high-risk aircraft categories, and potential areas for safety interventions. the goal is to inform decision-makers, industry stakeholders, and aviation division about key insights that can guide smarter, safer aviation practices.

Business understanding

- ▶ Aircraft accidents, though rare, carry significant human, economic, and reputational costs. Understanding their underlying causes and patterns is crucial for enhancing regulatory frameworks, improving pilot training, and designing safer aircraft.



To do this we have to understand
what the data we are dealing
with:

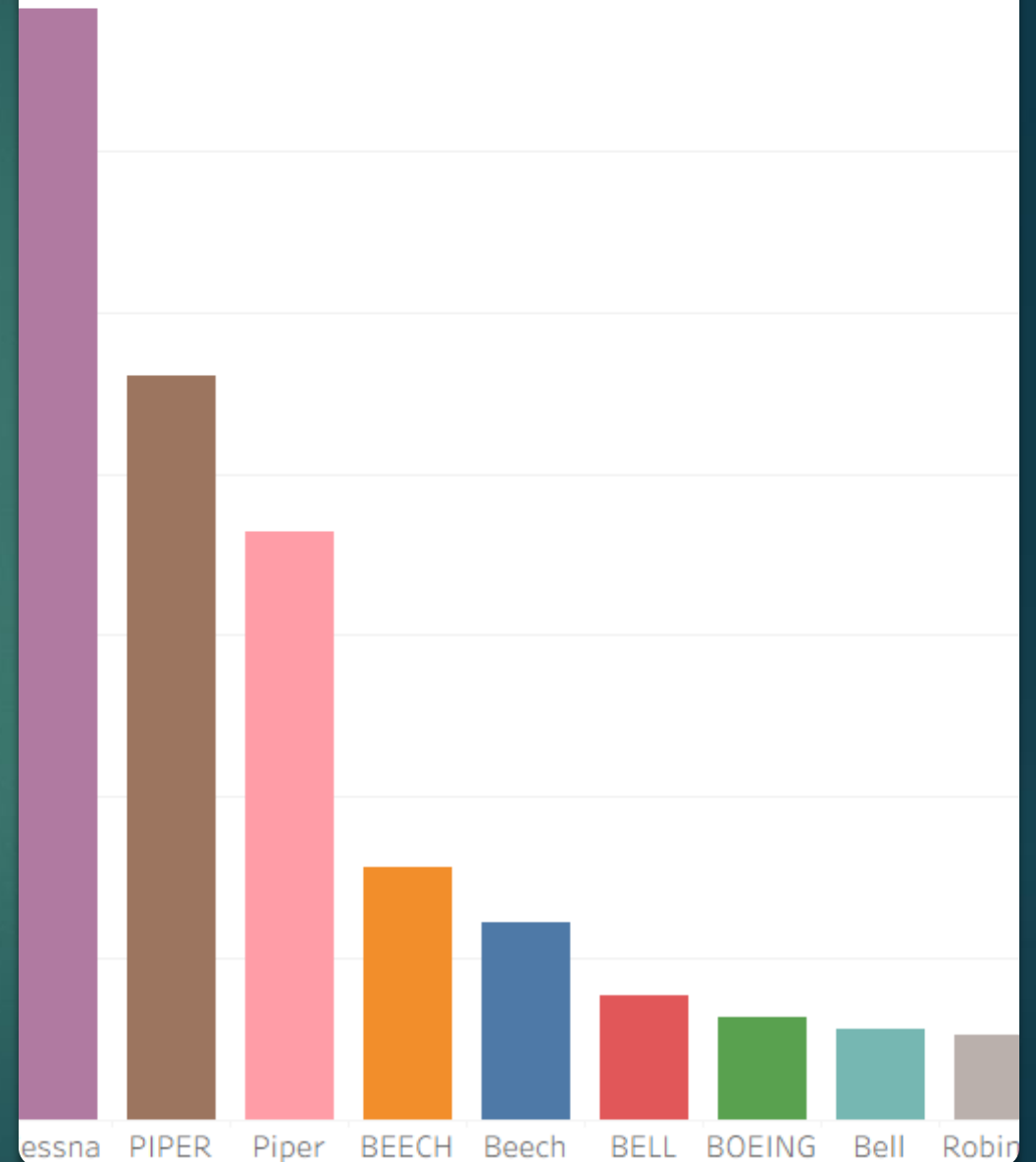
THIS IS DONE ON THE COMING SLIDES

Data understanding

- ▶ I used data from the Aviation dataset, covering 1900s through 2024. The dataset includes details on aircraft make and model, accident year, flight category, and the phase of flight. I cleaned the data to remove duplicates and filtered it to focus on specific aspects. The variables chosen were key to uncovering the most relevant and actionable trends.

Data analysis- visualization 1

This bar chart displays the top 10 aircraft models with the highest number of accidents. Cessna models appear most frequently, followed by Piper. While this doesn't confirm causation, it highlights models that may benefit from closer regulatory review or further research into usage patterns and maintenance practices."



Data analysis- visualization 2

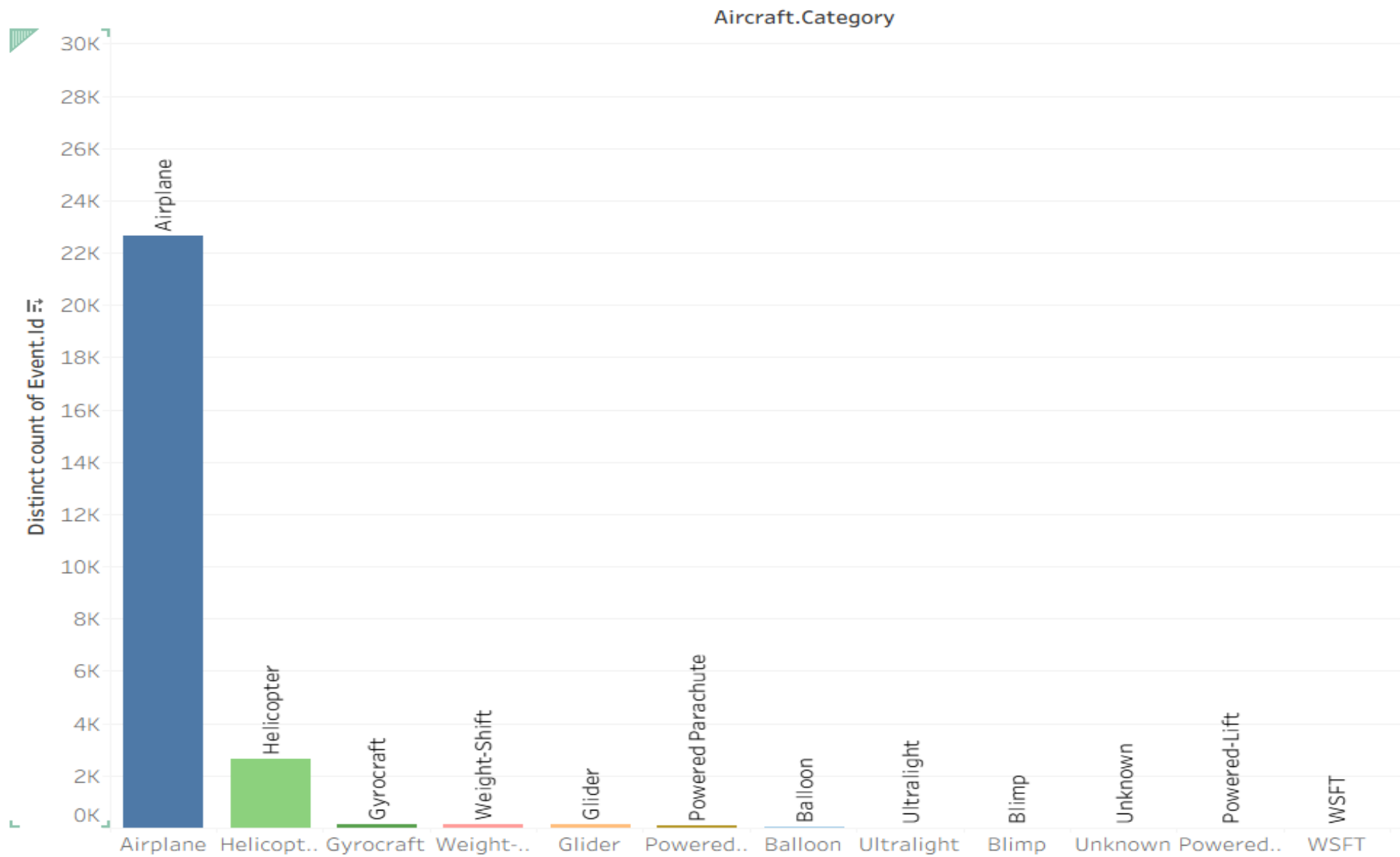
- ▶ "This chart shows the distribution of accidents across flight phases for different aircraft makes. Takeoff and landing—the most technically complex parts of a flight—are by far the riskiest stages. But for most of the makes , their accident phases are unknown ie cessna
- ▶ The heatmap is in the next slide

aircraft make vs phase of flight

Make	Broad.phase.of.flight											
	Null	Approach	Climb	Cruise	Descent	Go-around	Landing	Maneuveri..	Other	Standing	Takeoff	Taxi
Beech	Beech	Beech	Beech	Beech	Beech	Beech	Beech	Beech	Beech	Beech	Beech	Beech
BEECH	BEECH											
BELL	BELL											
Bell	Bell	Bell	Bell	Bell	Bell		Bell	Bell	Bell	Bell	Bell	Bell
BOEING	BOEING											
CESSNA	CESSNA											
Cessna	Cessna	Cessna	Cessna	Cessna	Cessna	Cessna	Cessna	Cessna	Cessna	Cessna	Cessna	Cessna
Piper	Piper	Piper	Piper	Piper	Piper	Piper	Piper	Piper	Piper	Piper	Piper	Piper
PIPER	PIPER											
Robinson	Robinson	Robinson		Robinson	Robinson	Robinson	Robinson	Robinson		Robinson	Robinson	Robinson

Data analysis- visualization 3

- ▶ This shows which type of aircraft designs are more prone to accidents.
- ▶ Aeroplanes have been found to be the most prone followed by helicopters



recommendations

- ▶ based on these insights, I've outlined four key recommendations:
- ▶ Conduct targeted inspections and reviews for aircraft models with high accident counts, like Cessna and Piper.
- ▶ Invest in specialized pilot training and simulation tools focused on takeoff and landing procedures.
- ▶ We can start with the helicopters to avoid expensive losses
- ▶ Review historical policies during accident spike years to identify lessons that can be applied proactively.



► Thank you so much for your attention. I'd be happy to answer any questions you have now or connect with you afterward

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