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IMPROVING AVIATION SAFETY THROUGH DATA-DRIVEN INSIGHTS

PATTERNS, RISKS, AND RECOMMENDATIONS

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GOAL

- Aviation accidents still occur despite improvements.
- Project goal: Identify high-risk aircraft, operators, and factors.
- Value: Support safer operations and smarter resource allocations.

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DATA

104

YEARS

23,967

ROWS

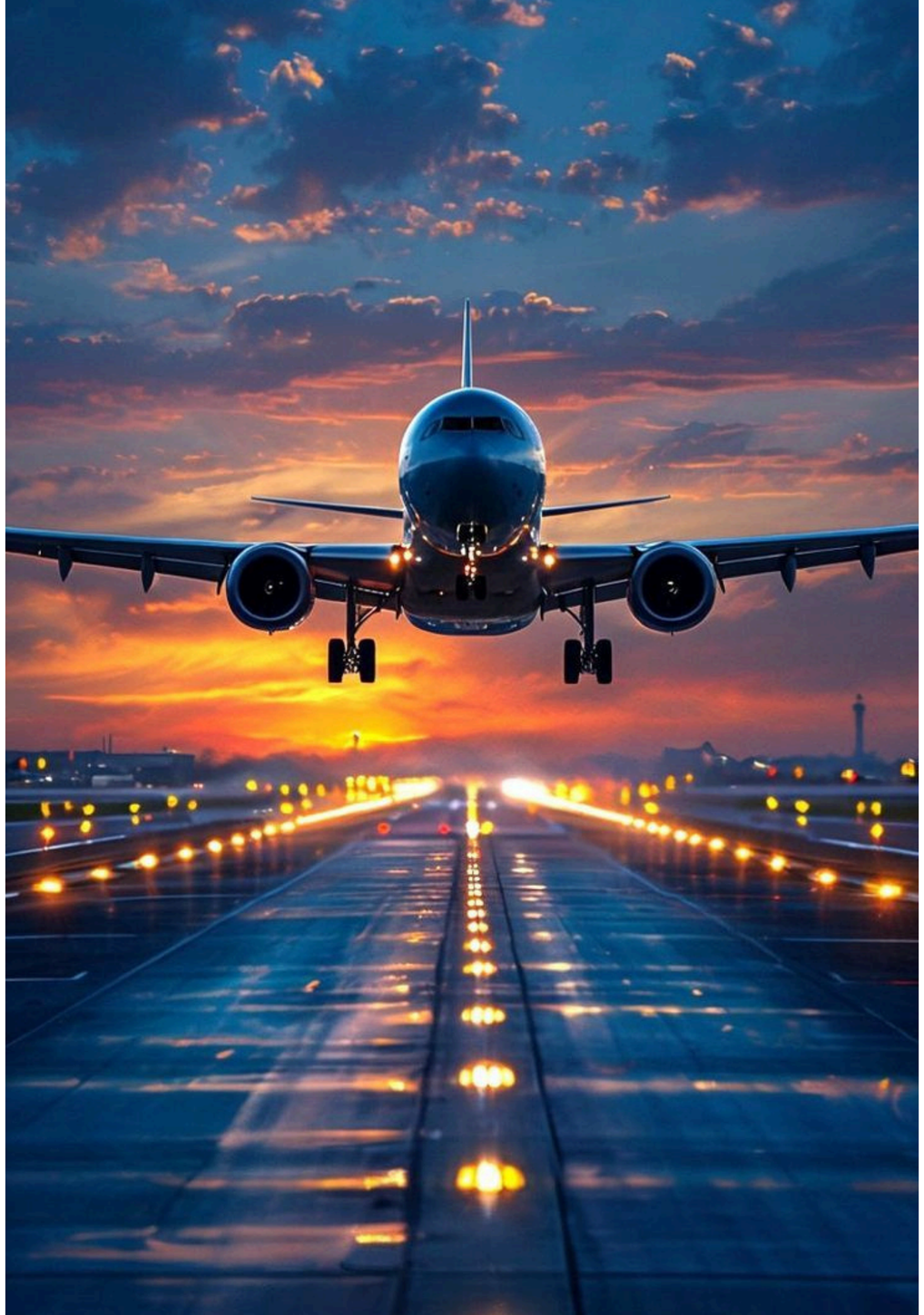
09

COLUMNS

COLUMNS

- DATE
- LOCATION
- COUNTRY
- TYPE
- REGISTRATION
- OPERATOR
- FATALITIES
- ACCIDENT CATEGORY
- YEAR

- THE DATA COVERS BOTH MILIARY AND CIVILIAN OPERATIONS



METHODS

- Counted accidents by operator and aircraft type.
- Calculated fatality rate(fatal accidents/ total accidents)
- Tracked trends by year, country andaccident categories.

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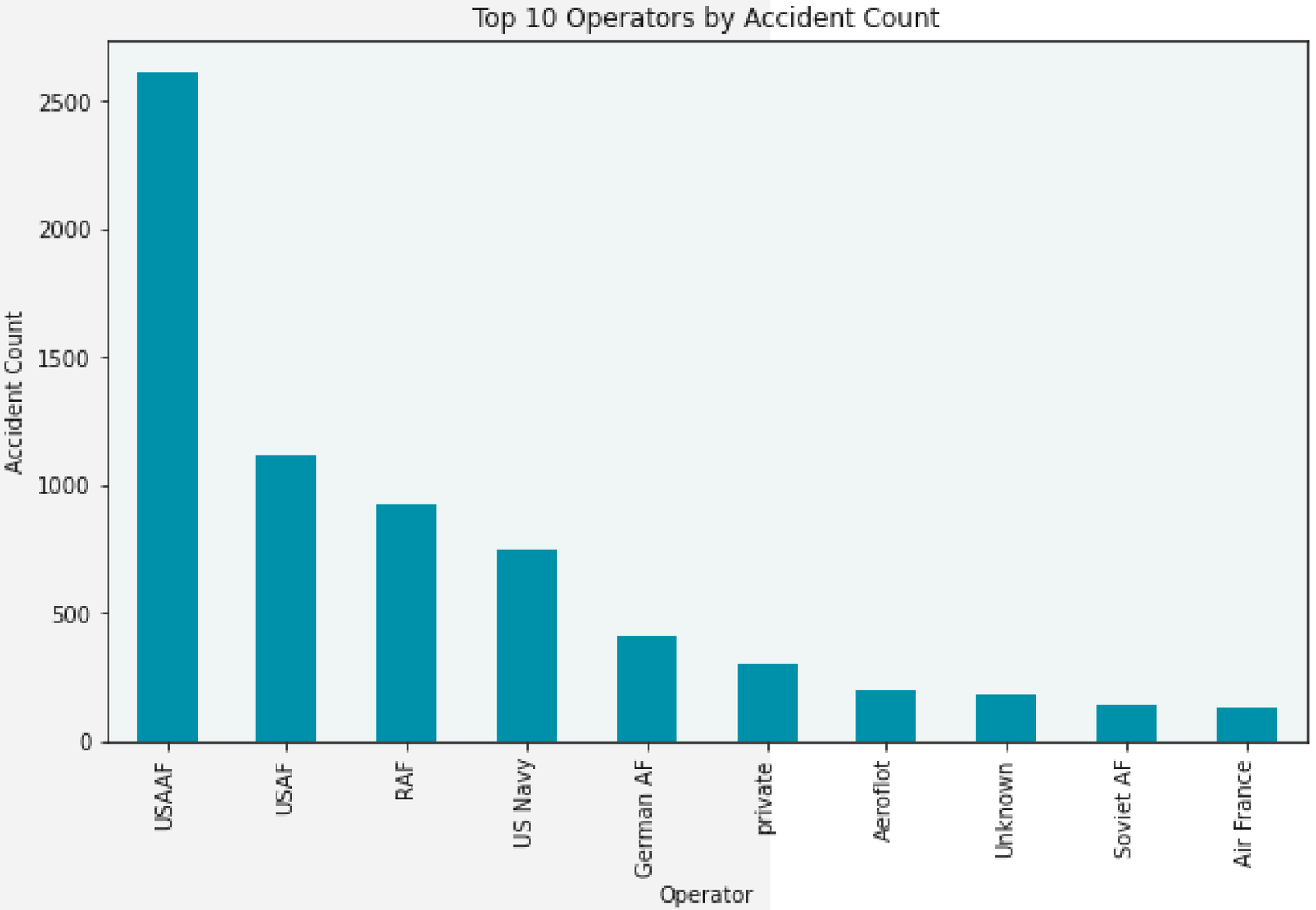
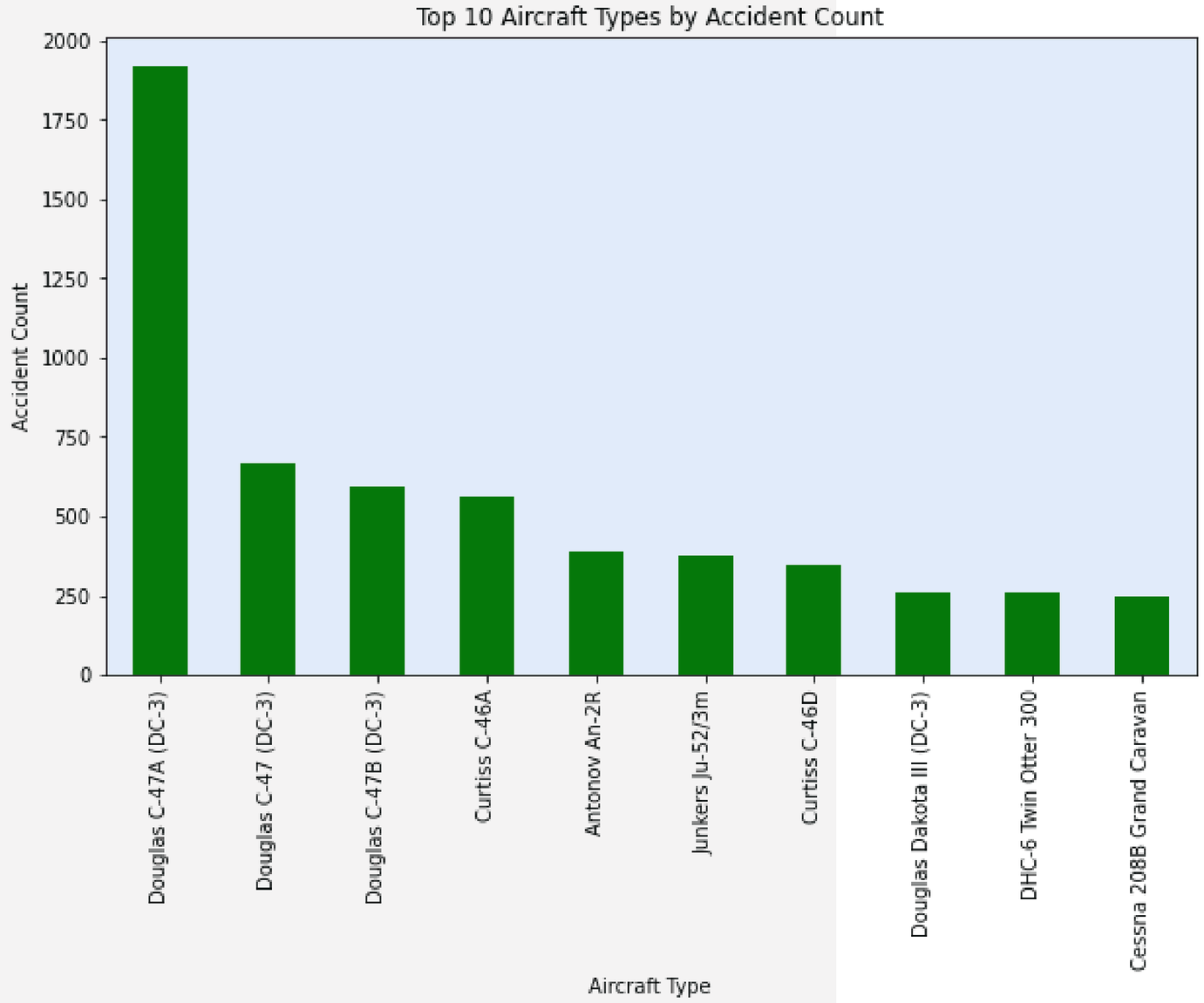
RESULTS-OPERATORS



TOP OPERATORS BY ACCIDENT

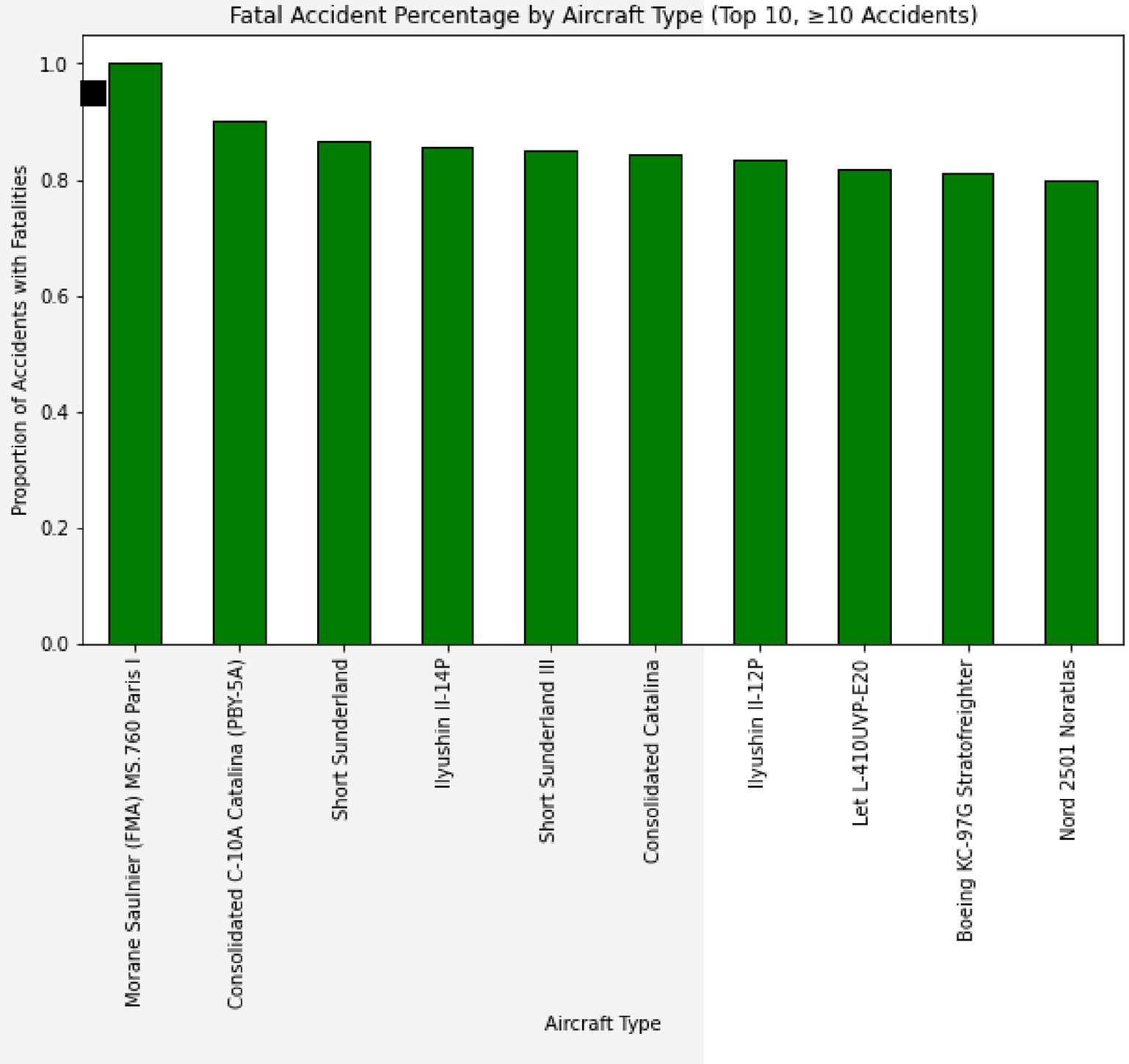
- Military operators dominate accident history — USAAF, USAF, RAF, US Navy, and German AF account for thousands of accidents.
- Private operators appear, but with far fewer accidents (likely due to smaller fleets and lighter aircraft).
- Civilian airlines like Aeroflot and Air France appear with notable but much lower counts compared to military.



RESULTS - AIRCRAFT TYPES

MOST ACCIDENT-PRONE AIRCRAFT

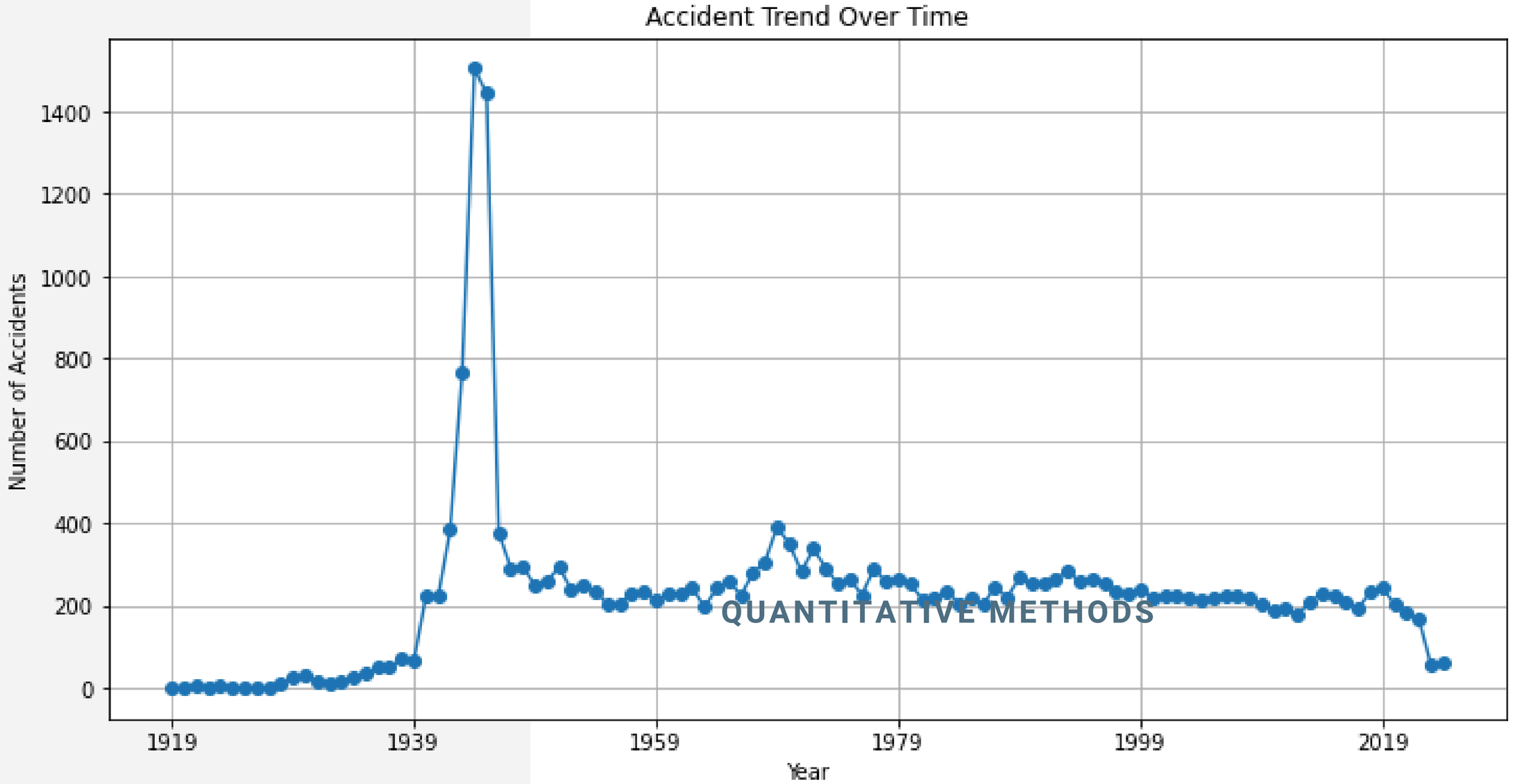
- The Douglas C-47 (military version of the DC-3) dominates with staggering counts across its sub-variants (C-47A/B, Dakota III).
- Other WWII-era transport aircraft like Curtiss C-46 and Junkers Ju-52 also appear high, again reflecting the war era.
- On the civilian side, Antonov An-2R, Twin Otter, and Cessna Caravan show up.



RESULTS-SEVERITY

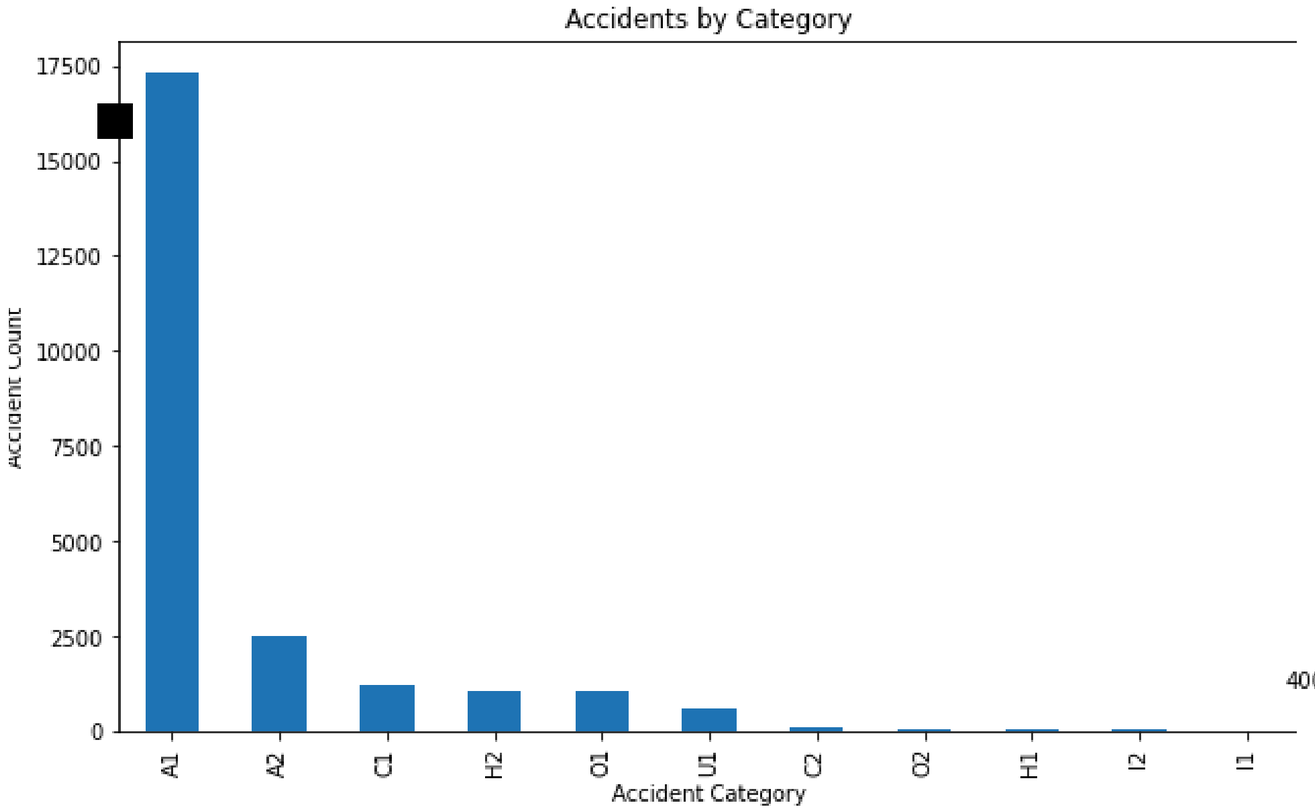
QUALITATIVE METHODS

- Some types show 100% fatal accident rates.
- Small/military aircraft often less survivable.



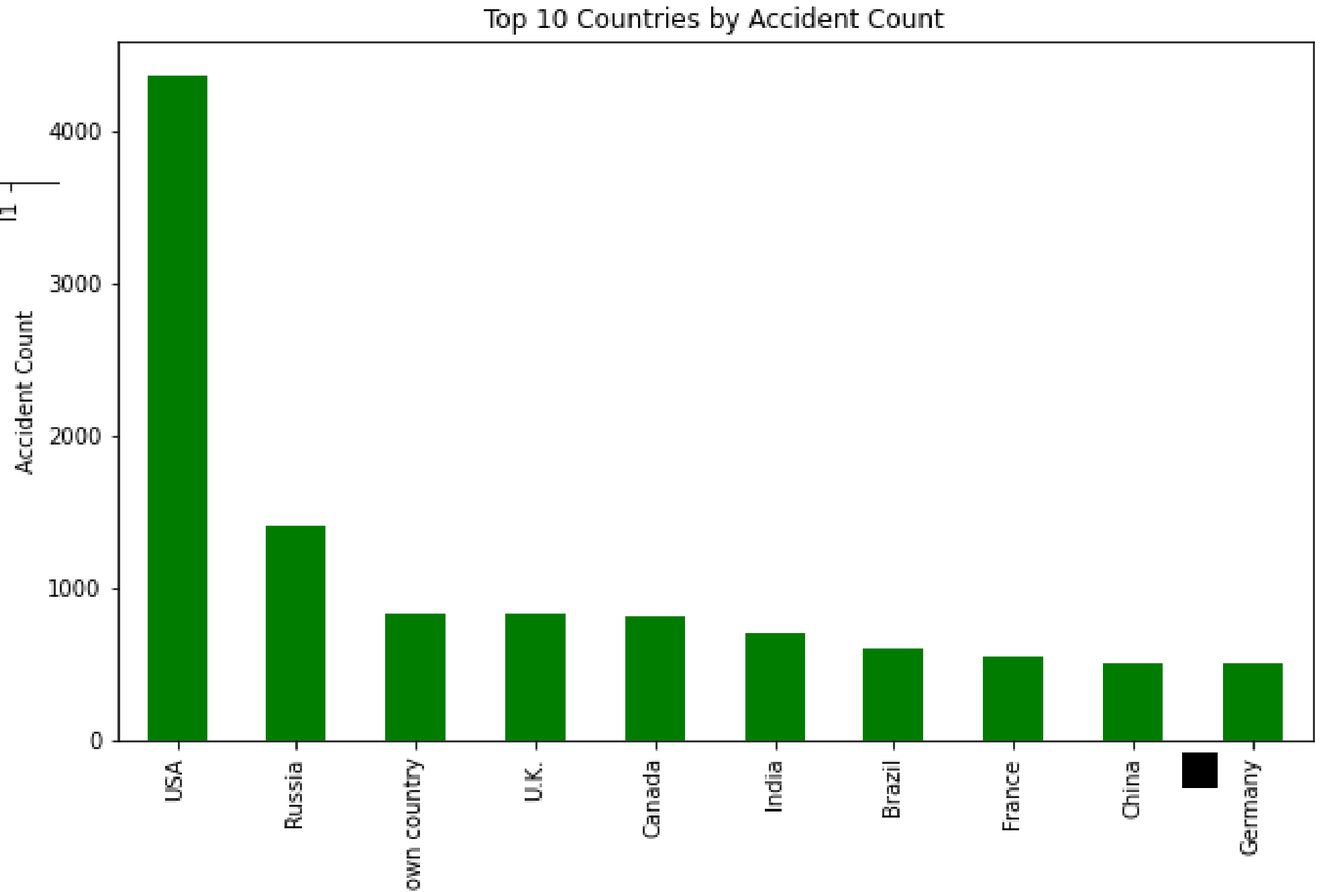
RESULTS- TREND OVER TIME

- Highlight spikes (WWII, Cold War) and decline (post-2000, COVID drop).



RESULTS-COUNTRY & CATEGORY

- USA leads (4,376 accidents), followed by Russia (1,418).
- Accident categories (A1 hull-loss dominates).



RECOMMENDATIONS

- Fleet Management: Retire or upgrade high-risk models
- Oversight: Focus on military/state operators
- Policy & Training: Target high-accident countries
- Preparedness: Use severity data for emergency planning

CONCLUSION

- Legacy aircraft (especially war-era and certain utility types) are accident-prone and often fatal when crashes occur. These should be phased out of active training and charter use.
- Modern jets and certified light trainers are far safer and should be the backbone of aviation training and commercial operations.
- Operational vigilance matters: safety gains can erode without continuous investment in incident reporting, security, and emerging technologies.
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THANK YOU

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