Aircraft Risk Analysis — Phase 1 Project

Problem Statement

- **Context:** Company expanding into aviation (commercial + private) and needs to evaluate aircraft risk before purchasing.
- **Problem:** No internal knowledge of which aircraft types are lowest risk.
- **Objective:** Identify **Make + Model** aircraft with the lowest historical safety risk and translate findings into actionable purchase guidance.

Top 10 Safest Aircraft Models (YR 2000 onwards)

- The analysis covers aircraft safety data **from the year 2000 onwards**.
- It evaluates **safety performance by aircraft make and model**, focusing on survival and fatality rates across recorded incidents.
- Only models with **at least 10 incidents** were considered to ensure reliability of results.

Top 10 Safest Aircraft Models (YR 2000 onwards) COUNT..

Make	Model	Survival Rate	Fatality Rate	Total Incidents
Cessna	180J	100.00%	0.00%	10
Boeing	747	100.00%	0.00%	11
DIAMOND AIRCRAFT IND INC	DA 20 C1	100.00%	0.00%	11
BOEING	737-800	99.87%	0.00%	20
Canadair	CL-600-2B19	99.70%	0.00%	14
BOEING	787	99.67%	0.00%	25
Boeing	737	99.65%	0.00%	43
BOEING	777	99.53%	0.00%	83
BOEING	757	99.52%	0.00%	31
BOEING	737-7H4	99.28%	0.00%	13

Fatalities by Number of Engines

- Single-engine aircraft account for **~74% of fatalities**
- Twin-engine aircraft account for **~21%**
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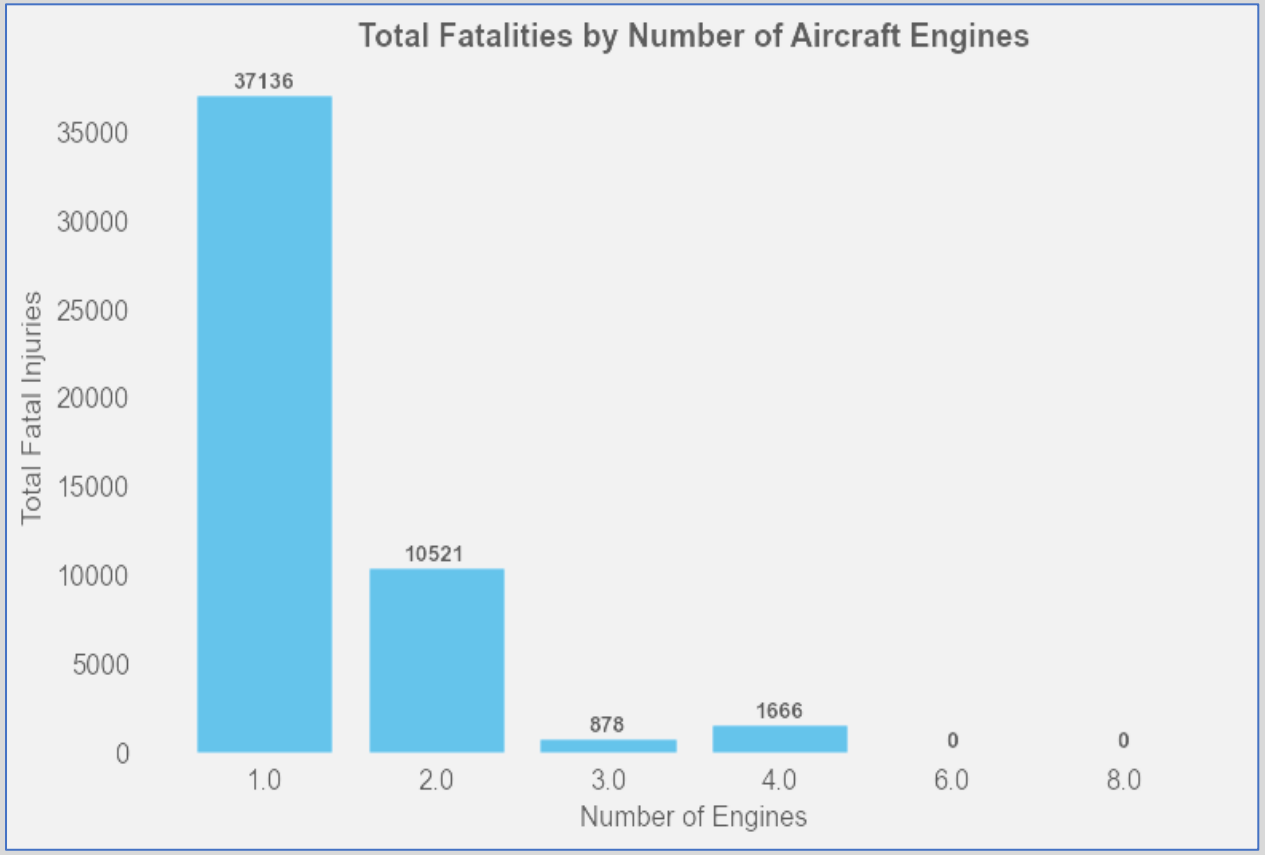
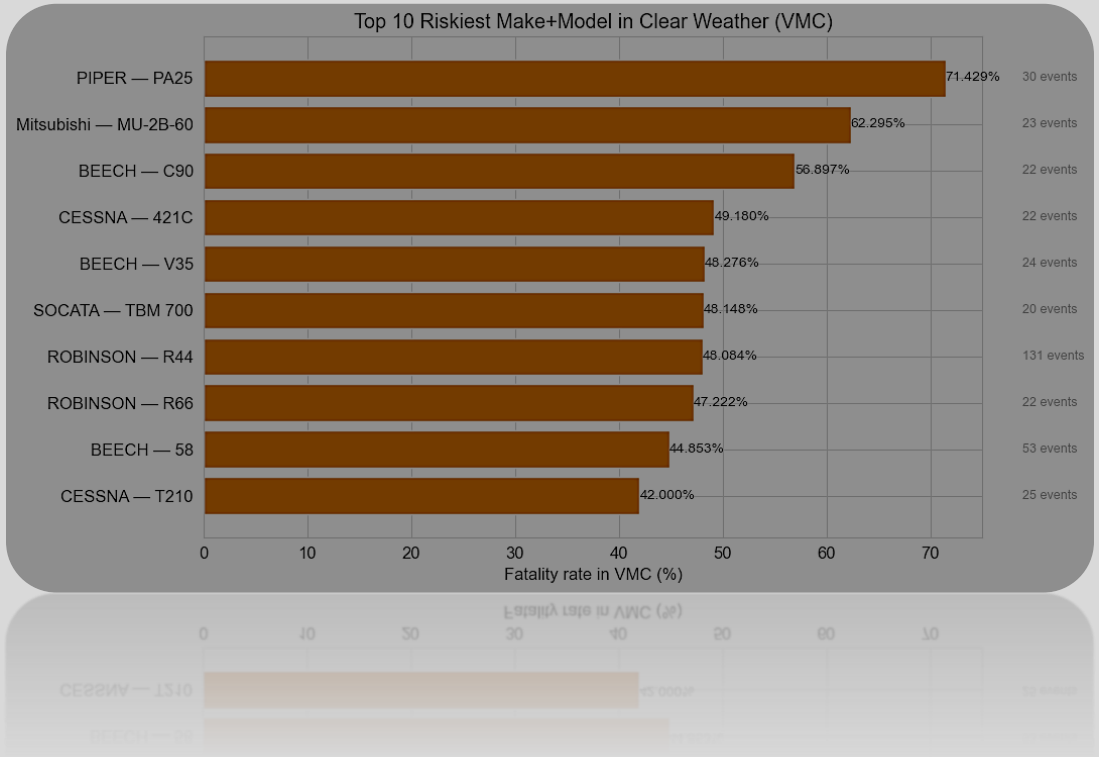


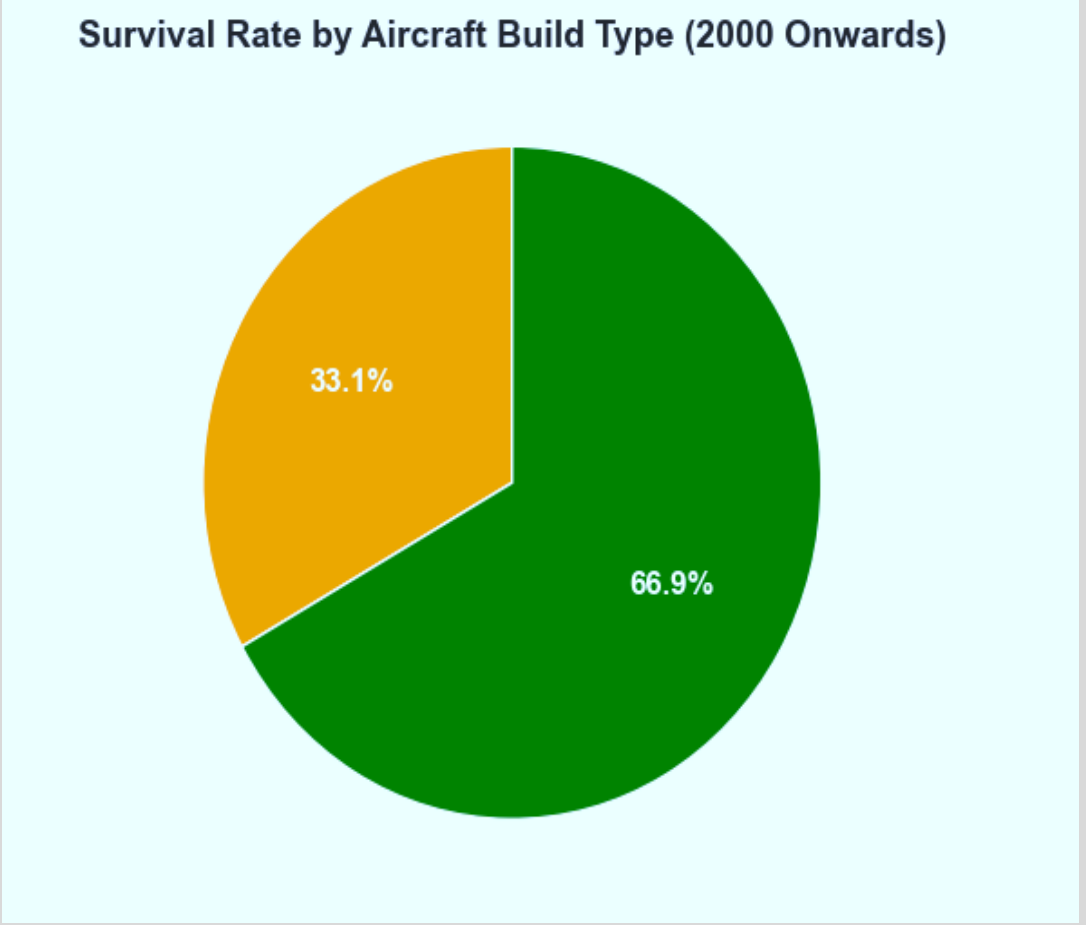
Models with poor outcomes in clear weather (VMC)

- Historical data show certain models notably the Piper PA-25 and several light/rotorcraft types have disproportionately high fatality shares in clear weather; treat these as red flags and require exposure-normalized validation and operational vetting before purchase.



Relevance of the “Amateur. Built” Analysis

- Professionally manufactured aircraft have **double the survival rate** and **less than half the fatality rate** of amateur-built planes.
- This is one of the most **striking safety disparities** in aviation data.
- This contrast reinforces how **engineering standards, maintenance quality, and pilot training** dramatically affect survival outcomes.
- The data clearly shows that certified aircraft are about twice as safe as amateur-built ones — proving that professional manufacturing, oversight, and maintenance are critical to aviation safety



RECOMMEDATIONS

- **Prefer certified, professionally manufactured models** — use the Top-10 safest models in the deck as our primary procurement pool; treat amateur-built aircraft as disqualifying unless exceptional mitigation exists.
- Apply simple acceptance thresholds — require Survival Rate ≥ 0.85, Fatality Rate ≤ 0.07, and ≥ 10 recorded incidents to ensure statistical reliability.
- **Enforce hard operational controls on any purchase** — full maintenance/logbook audit, AD compliance, IFR-capable avionics if needed, and mandatory company type-checks + recurrent training for pilots.

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