



# *Cleared for Takeoff: Data-Driven Aircraft Risk Analysis for Safe Fleet Acquisition*

By  
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***Investing  
Opportunity for  
Aircraft***





## Overview (Aviation Data)

### Objectives :

- Identified safest aircraft models to launch in aviation business.
- Translated 60+ years of accident data into 3 actionable recommendations.

### Goal:

- Build a reputation for safety in a new Aviation industry.



# Business Understanding

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## Problem Statement :

*To identify which aircraft make and model have the lowest historical accident rates, fewer fatal incidents, and lower safety risks.*





# Data Understanding

## I Analyzed

23,000+ incident reports (1962-2023) from Aviation \_Data.csv file

## Data Cleanup:

Excluded models with incomplete records and filled the ones that had less missing values

Changed Data Types with the preferred ones

Correcting data inconsistency

## Focused on:

### 1. Make and Model Overview

Identified which aircraft have the most/fewest incidents

### 2. Injury & Damage Analysis

Analyze injury severity and aircraft damage for the safest models identified in make and model overview

### 3. Safer Aircraft Identification

Used Total incidents, Counts all reported incidents per aircraft model

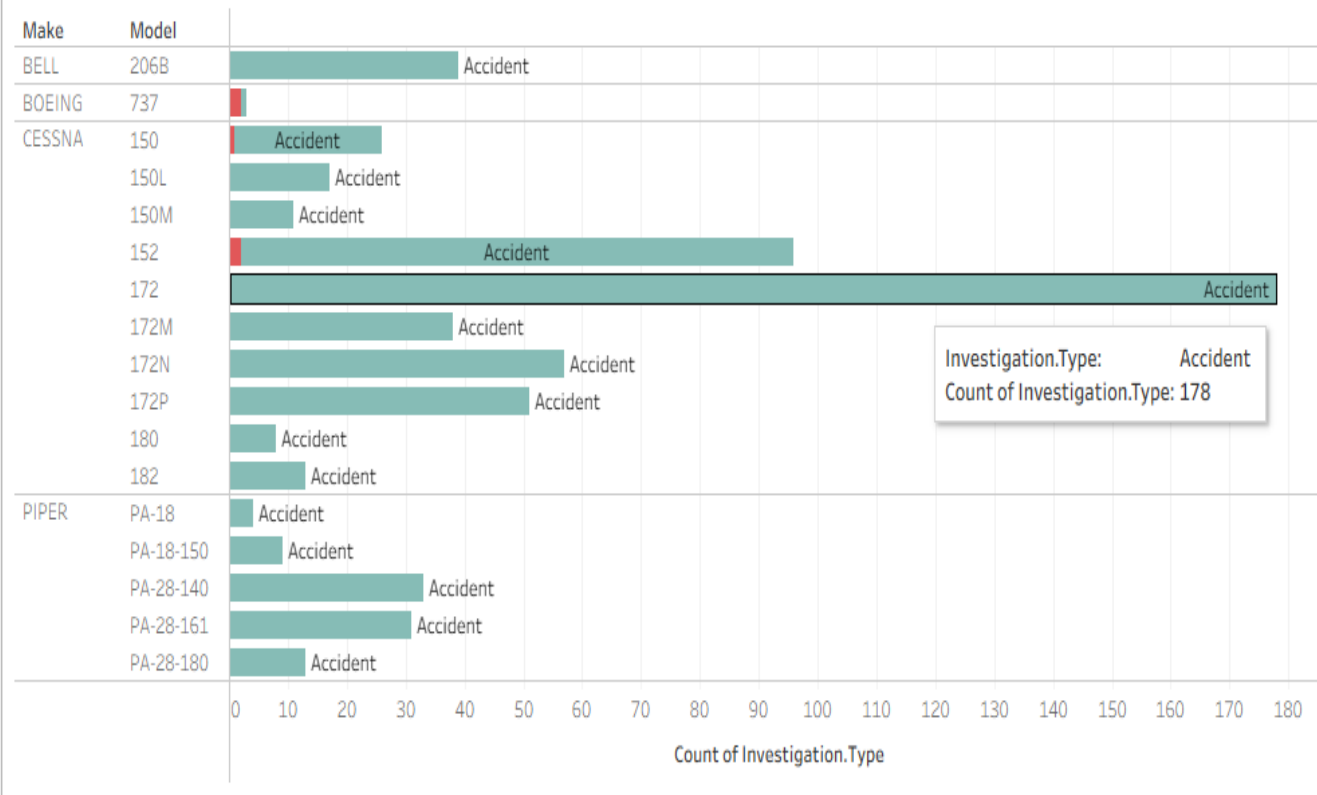
Fatal incidents total

Safety score (60% incidents 40% fatalities)



# Key Finding In Make and Model Overview

Reported Incident Frequency by Aircraft Make & Model



## For the Top 20 Model

### Top Risky Models:

- Cessna 152: 94 incidents
- Cessna 172: 178 incidents
- Piper PA-28-140: 33 incidents

### Which Concluded:

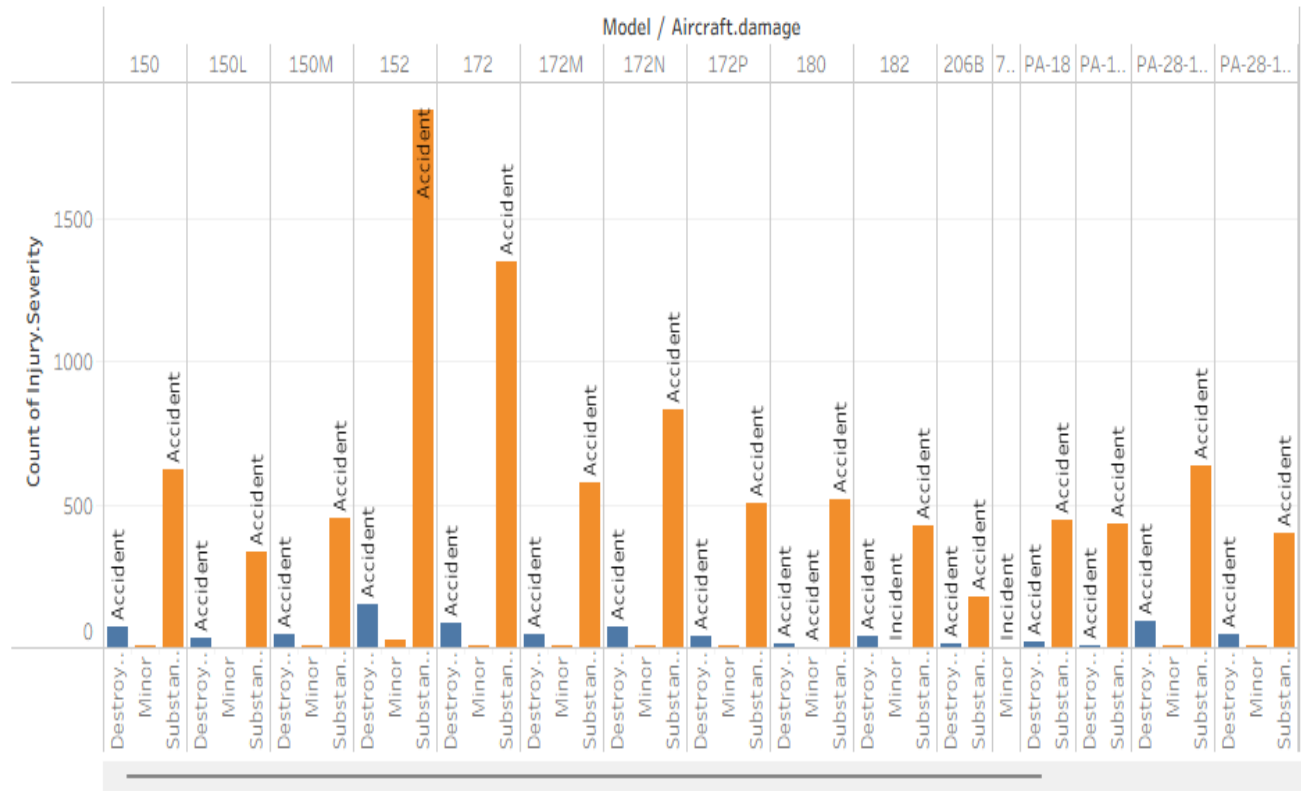
- These popular training planes have high exposure Not ideal for new operators.

### Why?

- These models dominate incident reports; likely due to training use and high fleet numbers\*."

## Finding 2 – Damage Severity

## Damage Severity vs Injury Outcomes



**Shows some models frequently result in total losses(35% for Cessana 152)**

**Ground Cessna 152/172 and Piper PA-28s from initial fleet plans.**

**Lease Cessna 206B** for early operations to **minimize risk.**

## Audit Boeing 737 data for commercial viability.

## Damage Severity vs Injury Outcomes

Model	Risk Level / Aircraft.damage / Investigation.Type			
	Standard Risk		Substantial Accident	High Risk Destroyed Accident
	Minor Accident	Incident		
150	3	3	621	74
150L	1	2	334	34
150M	5	2	450	46
152	11	15	1,883	151
172	5	2	1,346	86
172M	6	3	578	48
172N	5	1	834	71
172P	2	2	506	41
180	2		519	15
182		3	423	37
206B			180	16
737		1		
PA-18			444	17
PA-18-150			432	9
PA-28-140	2	3	635	92
PA-28-161	2	3	398	45
PA-28-180	2	1	384	36

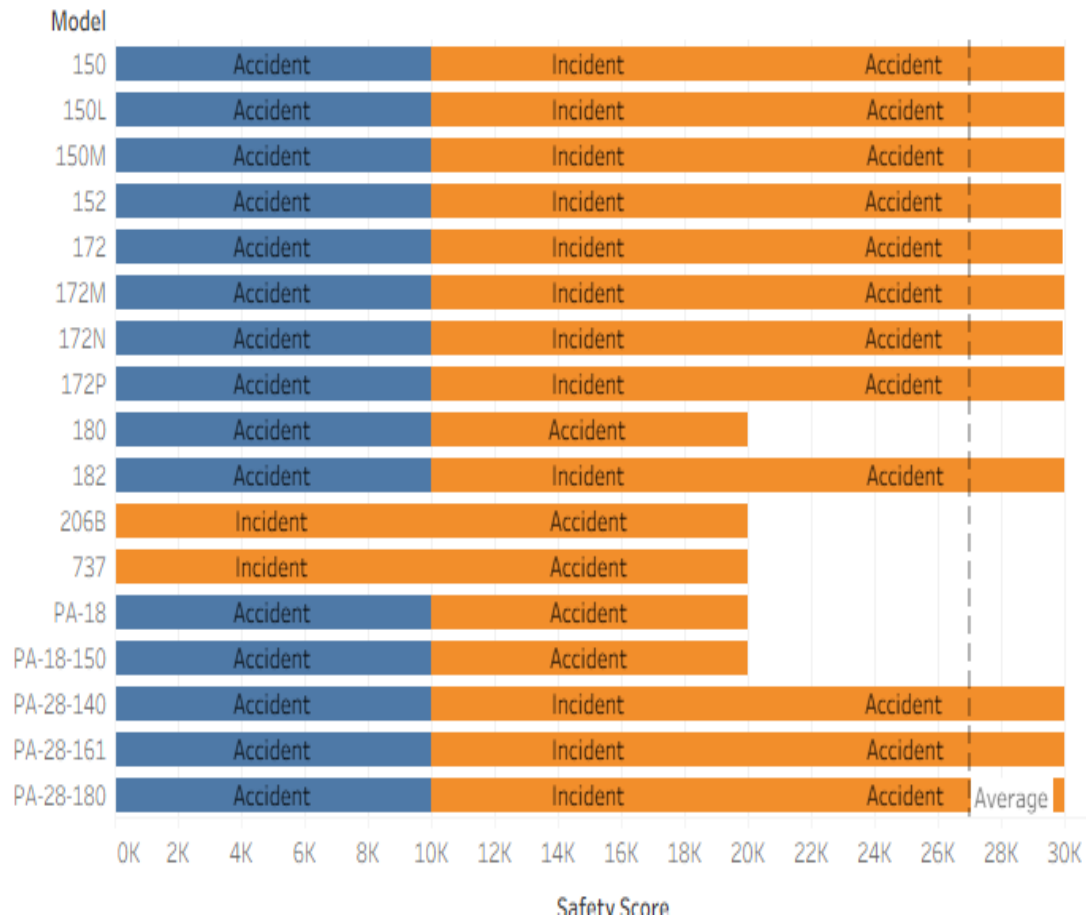
**Cessna 152:** 35% of accidents result in total loss.

**Piper PA-28-140:** 99.7% severe damage rate.

**Cessna 206B:** 92% minor damage—ideal for cost control

# Key Finding 3 – Safety Scores

Quantified Safety Ranking of Aircraft Models



**Cessna 152:** 9,990.77 score but **1,883 severe accidents** (Sheet 2).

**Boeing 737:** 9,999.60 score + **1 incident** (trustworthy).

Quantified Safety Ranking of Aircraft Models

Model	Risk Level / Investigation.Type		
	Standard Risk Accident	Incident	High Risk Accident
150	9,958.1	9,999.8	9,994.8
150L	9,977.9	9,999.9	9,997.7
150M	9,969.2	9,999.9	9,996.8
152	9,873.0	9,999.1	9,989.8
172	9,909.6	9,999.9	9,993.8
172M	9,960.6	9,999.9	9,996.6
172N	9,942.9	9,999.9	9,995.2
172P	9,965.0	9,999.9	9,997.1
180	9,964.0		9,998.8
182	9,968.8	9,999.7	9,997.3
206B	9,999.7	9,999.9	
737	9,999.3	9,999.6	
PA-18	9,967.4		9,998.7
PA-18-150	9,968.3		9,999.2
PA-28-140	9,958.3	9,999.8	9,994.0
PA-28-161	9,973.4	9,999.8	9,997.2
PA-28-180	9,974.6	9,999.9	9,997.5
PA-28-181	9,977.4	9,999.9	9,997.3

Cessna 206B (low damage) and Boeing 737 (low incidents + high score).



# Recommendation

Category	Model	Action
Immediate Buys	Cessna 206B	Priority acquisition - lowest damage rates
Commercial option	Boeing 737	Lease for passenger routes - validated safety
Conditional Use	Cessna172/152	Only with flight school partnerships (risk transfer)

## Q&A

*Does Air craft Model, Make, Engine. Type, Weather. Condition etc. contribute to Airplain Crush or is it the pilot error??*





## In Conclusion

While safety scores appear strong across all models, cross-referencing with damage data reveals:

### **Two safe paths forward:**

Build fleet around Cessna 206B/Boeing 737

Negotiate risk-sharing for essential training aircraft



# THANK YOU!

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