Trends in Aviation Accidents

An analysis from 2012 - 2021

Group 4 | Isabella Murillo, Leticia De Araujo, Caden Duke, Cheng Yu Ho, Tse-An Chen

Project Objectives

Inform/Educate:

- Federal Aviation Administration on certain findings regarding **pilot and aircraft performance**

- Aircraft manufacturers on **considering innovative features** to better help the pilot

- Student pilots and flight schools on common crash causes to **strengthen their curriculum** and trainings

Business questions

1 Which state/region in the US has the highest frequency of airplane accidents?

2 Which months have the highest number of fatal accidents?

3 Which types of flights had the highest number of airplane accidents?

4 What are the 5 most common reasons for airplane accidents?

5 What percentage of flight accidents are fatal?

```sql
SELECT StateORRegion, COUNT(*) as AccidentCount
FROM Accidents
WHERE Country = 'United States'
GROUP BY StateorRegion
ORDER BY AccidentCount DESC
LIMIT 5
```

	A-Z StateOrRegion	123 AccidentCount
1	California	1,136
2	Texas	1,057
3	Florida	937
4	Alaska	703
5	Arizona	463

Question 1 Business Recommendation

Some business recommendations include:

- **Training pilots and pilot students on the terrain of California** and potential "hotspots" for aircraft crashes

- **Include higher standards for flying aircraft**, especially personal aircraft, in California such as more flight hours needed to fly in California or specific licenses

- **Increase the frequency of maintenance protocols** for aircraft in California

Question 2: Which months had the highest numbers of fatal accidents?

```sql
SELECT
    SUBSTR(EventDate, 1, INSTR(EventDate, '/') - 1) AS Month,
    COUNT(*) AS FatalAccidents
FROM Accidents
WHERE InjuryLevel = 'Fatal'
GROUP BY Month
ORDER BY FatalAccidents DESC
```

	Month	FatalAccidents
1	7	255
2	8	243
3	6	240
4	9	216
5	10	209
6	5	208
7	4	166
8	11	165
9	12	155
10	3	151
11	2	134
12	1	127

Question 2 Business Recommendation

Note: The months with the largest number of fatal plane accidents are all in the summer – **July** (7), **August** (8), and **June** (6).

Some business recommendations include:

- Train flight service specialists to provide **stronger support to pilots** in flight during these months
  - *Example: altitude and airspeed*

- Enforce specific **safety measures during seasonal influxes** where weather or air traffic might be more difficult

- **Investigate conditions** during these particular months that may have contributed to fatality of the crashes

Question 3: Which types of flights had the highest number of airplane accidents?

```sql
SELECT PurposeOfFlight, COUNT(*) AS AccidentCount
FROM Aircraft
GROUP BY PurposeOfFlight
ORDER BY AccidentCount DESC
LIMIT 5
```

	PurposeOfFlight	AccidentCount
1	Personal	8,347
2	Instructional	1,803
3	Aerial application	615
4	Business	311
5	Positioning	229

Question 3 Business Recommendation

Some business recommendations include:

- Require **more advanced training and safety courses** for those planning on **flying personal aircraft**

- **Enhance safety features** in aircrafts for aircrafts specifically manufactured for personal, training, and aerial application operations

- **Introduce incentives to aircraft owners and manufacturers** to keep aircraft up to date on technology and safety feature such as modern control systems.

Question 4: What are the 5 most common defining events for airplane accidents?

```sql
SELECT DefiningEvent, COUNT(*) AS CauseCount
FROM Aircraft
GROUP BY DefiningEvent
ORDER BY CauseCount DESC
LIMIT 5
```

	A-z DefiningEvent	123 CauseCount
1	Loss of Control In-Flight	2,232
2	System/Component Failure - Powerplant	2,050
3	Loss of Control on Ground	2,038
4	Abnormal Runway Contact	1,608
5	Fuel Related	807

Powerplant: the engine of an aircraft, or what produces the thrust to propel it.
Abnormal Runway Contact: landing or takeoff involving abnormal runway or landing surface contact.

Question 4 Business Recommendation

Some business recommendations include:

- **Provide education** for techniques in maintaining control of aircraft and checking the powerplants of your aircraft

- **Improve weather risk assessment** and more options in strategies to adapt to sudden weather changes – Such as diversion in cases of severe weather

- **Develop more monitoring systems** to assist pilots in controlling certain factors such as speed of descent and adapting to runway conditions
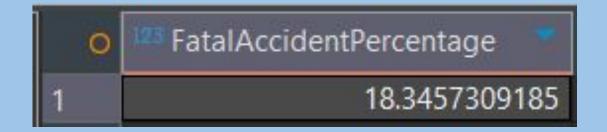
Question 5: What percentage of flight accidents are fatal?

```sql
SELECT COUNT(*) AS InjuryLevel
FROM Accidents
WHERE InjuryLevel = 'Fatal';

SELECT
    (COUNT(CASE WHEN InjuryLevel = 'Fatal' THEN 1 END) * 100.0/ COUNT(*)) as FatalAccidentPercentage
FROM Accidents
```

	FatalAccidentPercentage
1	18.3457309185

Question 5 Business Recommendation

Some business recommendations include:

- Assess risk regarding airline and the aircraft to **determine appropriate insurance coverage**

- Suggest that government policies be introduced to **mandate relevant safety regulations**

- Invest in safety marketing to **educate the general public** on bracing positions and details that could increase their likelihood of survival

Thank you!