Airplane Crash Analysis using Power BI

By- Ayush Kumar

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Project Overview

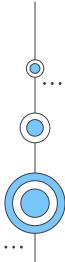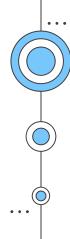# What is this Project?

This project is centered around a thorough examination of **aircraft accidents and associated fatalities** from **1908 to 2023**. The dataset encompasses vital details like the dates and locations of crashes, flight operators, flight specifics, types of aircraft, and statistics on fatalities. The objective is to utilize **Power BI** to create interactive visualizations and gain profound insights into the patterns, underlying factors, and trends in aviation accidents. The analysis is intended to equip stakeholders with significant information that can aid in **improving aviation safety and reducing risks**.

. . .

Understanding the Steps

Loading Dataset

The dataset has to be uploaded into the **Power BI desktop** application.
. . .

Transforming Dataset

Transform the data in the **Power Query**. Involves **Data Cleaning**, **Feature Engineering** etc.

Dashboard

Creating a fully interactive dashboard for effective insight generation and **Data Visualization**.
. . .

Dataset Description

Date: The date when the airplane crash occurred.

Time: The specific time when the airplane crash happened.

Location: The geographical location where the airplane crash took place.

Operator: The operator or airline that was involved in the incident.

Flight #: The flight number that is associated with the incident.

Route: The planned route that the flight was supposed to take.

AC Type: The type of aircraft that was involved in the crash.

Registration: The registration details of the aircraft.

cn/ln: The construction or serial number of the aircraft.

Aboard: The total number of individuals that were aboard the aircraft.

Aboard Passengers: The number of passengers that were aboard the aircraft.

Aboard Crew: The number of crew members that were aboard the aircraft.

Fatalities: The total number of fatalities in the incident.

Fatalities Passengers: The number of passenger fatalities.
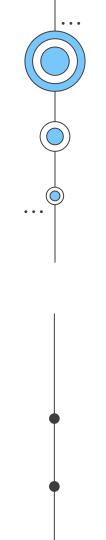
Fatalities Crew: The number of crew member fatalities.

Ground: The number of casualties on the ground, if any.
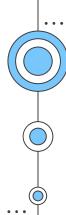
Summary: A brief summary or description of the incident.

4998 × 17
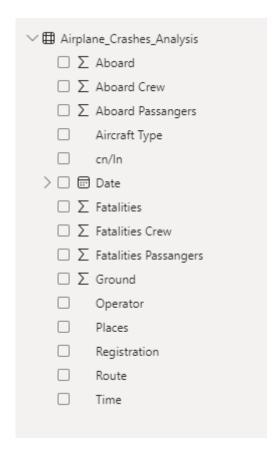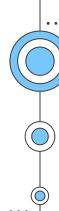
02

Data Transformation
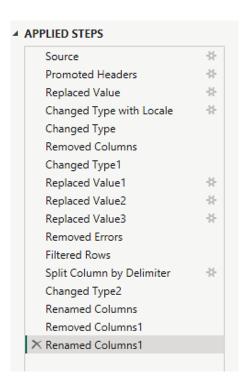
Final Dataset after Transformation

Airplane_Crashes_Analysis
- Σ Aboard
- Σ Aboard Crew
- Σ Aboard Passangers
- Aircraft Type
- cn/ln
- Date
- Σ Fatalities
- Σ Fatalities Crew
- Σ Fatalities Passangers
- Σ Ground
- Operator
- Places
- Registration
- Route
- Time
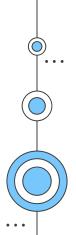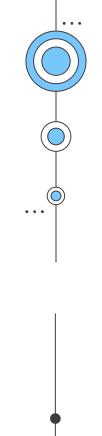
Steps applied in the Power Query to transform the dataset

APPLIED STEPS

- Source
- Promoted Headers
- Replaced Value
- Changed Type with Locale
- Changed Type
- Removed Columns
- Changed Type1
- Replaced Value1
- Replaced Value2
- Replaced Value3
- Removed Errors
- Filtered Rows
- Split Column by Delimiter
- Changed Type2
- Renamed Columns
- Removed Columns1
- ✕ Renamed Columns1
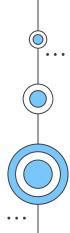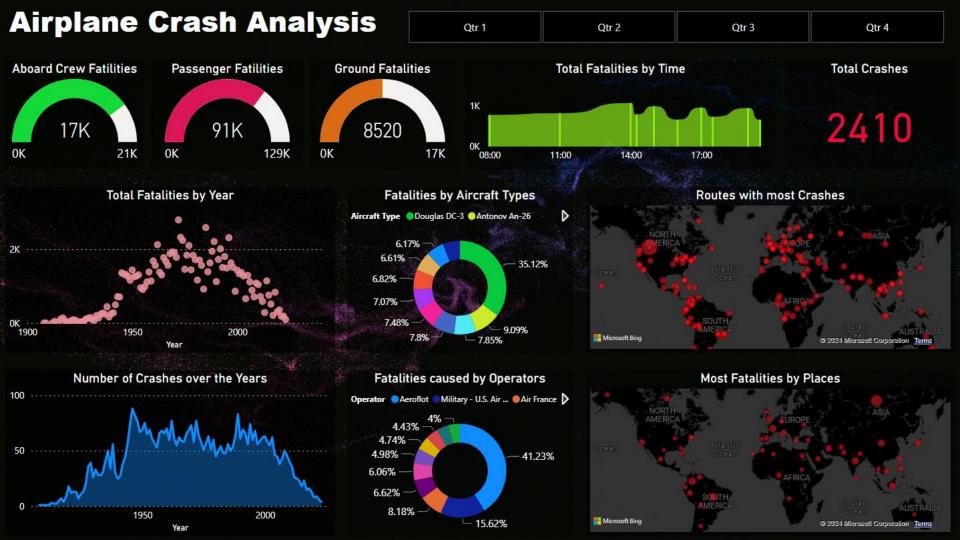
Each step has its own separate command through which Power Query transforms the data.

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Dashboard & Insights

Airplane Crash Analysis

Aboard Crew Fatilities

17K

OK — 21K

Passenger Fatilities

91K

OK — 129K

Ground Fatalities

8520

OK — 17K

Total Fatalities by Time

1K

0K

08:00　11:00　14:00　17:00

Total Crashes

2410

Total Fatalities by Year

2K

0K

1900　1950　2000

Year

Fatalities by Aircraft Types

Aircraft Type ● Douglas DC-3 ● Antonov An-26 ▷

6.17%
6.61%
6.82%
7.07%
7.48%
7.8%

35.12%

9.09%

7.85%

Routes with most Crashes

NORTH AMERICA — ASIA — EUROPE

Ocean — Atlantic Ocean

SOUTH AMERICA — AFRICA

Indian Ocean — AUSTRALIA

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Number of Crashes over the Years

100

50

0

1950　2000

Year

Fatalities caused by Operators

Operator ● Aeroflot ● Military - U.S. Air ... ● Air France ▷

4%
4.43%
4.74%
4.98%
6.06%
6.62%
8.18%

41.23%

15.62%

Most Fatalities by Places

NORTH AMERICA — EUROPE — ASIA

Ocean — Atlantic Ocean

SOUTH AMERICA — AFRICA

Indian Ocean — AUSTRALIA

Microsoft Bing

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Airplane Crash Analysis

Aboard Crew Fatilities

17K
0K   21K

Passenger Fatilities

91K
0K   129K

Ground Fatalities

8520
0K   17K

Total Fatalities by Time

1K

0K   08:00   11:00   14:00   17:00

Total Crashes

2410

Total Fatalities by Year

2K

0K
1900   1950   2000
Year

Fatalities

Aircraft Type ● Douglas DC-3 ● Antonov An-26 ▶

6.17%
6.61%
6.82%
7.07%
7.48%
7.8%   9.09%
7.85%

Routes with most Crashes

91000 fatalities
out of total aboard
passengers, i.e.
129000.

≈ 70%

Number of Crashes over the Years

100

50

0
1950   2000
Year

Fatalities by Operators

Operator ● Aeroflot ● Military - U.S. Air ... ● Air France ▶

4%
4.43%
4.74%
4.98%   41.23%
6.06%
6.62%
8.18%
15.62%

Most Fatalities by Places

Airplane Crash Analysis

Qtr 1 Qtr 2 Qtr 3 Qtr 4

Aboard Crew Fatilities
17K
0K 21K

Passenger Fatilities
91K
0K 129K

Ground Fatalities
8520
0K 17K

Total Fatalities by Time
1K
08:00 11:00 14:00 17:00

Total Crashes
2410

Total Fatalities by Year
2K
0K
1900

Fatalities by Aircraft Types
Aircraft Type ● Douglas DC-3 ● Antonov An-26
6.17%
4.61%
6.02% 35.12%
7.07%
7.48%

Routes with most Crashes

Shows the Casualties on the ground, if any.

Number of Crashes over the Years
100
50
0
1950 2000
Year

Fatalities caused by Operators
Operator ● Aeroflot ● Military - U.S. Air ... ● Air France
4%
4.43%
4.74% 41.23%
4.98%
6.06%
6.62%
8.18%
15.62%

Most Fatalities by Places

Airplane Crash Analysis

Qtr 1 Qtr 2 Qtr 3 Qtr 4

Aboard Crew Fatilities — 17K (0K – 21K)

Passenger Fatilities — 91K (0K – 129K)

Ground Fatalities — 8520 (0K – 17K)

Total Crashes — 2410

Total Fatalities by Time

1K
0K
08:00   11:00   14:00   17:00

Number of fatalities across various times. Shown by this Ribbon Chart.

Total Fatalities by Year

2K
0K
1900   1950
Year

Fatalities by Aircraft Types

Aircraft Type ● Douglas DC-3 ● Antonov An-26

35.12%
7.07%
7.8%
7.85%
9.09%

Routes with most Crashes

NORTH AMERICA
ASIA
AFRICA
SOUTH AMERICA
AUSTRALIA
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Number of Crashes over the Years

100
50
0
1950   2000
Year

Fatalities caused by Operators

Operator ● Aeroflot ● Military - U.S. Air ... ● Air France

4%
4.43%
4.74%
4.98%
6.06%
6.62%
8.18%
15.62%
41.23%

Most Fatalities by Places

NORTH AMERICA
EUROPE
ASIA
SOUTH AMERICA
AUSTRALIA
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Airplane Crash Analysis

Qtr 1 Qtr 2 Qtr 3 Qtr 4

Aboard Crew Fatilities
17K
0K 21K

Passenger Fatilities
91K
0K 129K

Ground Fatalities
0K 17K

Total Fatalities by Time
08:00 11:00 14:00 17:00

Total Crashes
2410

Total number of airplane crashes occurred.

Total Fatalities by Year
2K
0K
1900 1950 2000
Year

Fatalities by Aircraft Types
Aircraft Type ●Douglas DC-3 ●Antonov An-26
6.17%
6.61%
6.82% 35.12%
7.07%
7.48% 9.09%
7.8% 7.85%

Routes with most Crashes

Number of Crashes over the Years
100
50
0
1950 2000
Year

Fatalities caused by Operators
Operator ●Aeroflot ●Military - U.S. Air ... ●Air France
4%
4.43%
4.74%
4.98% 41.23%
6.06%
6.62%
8.18% 15.62%

Most Fatalities by Places
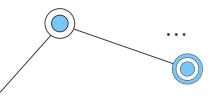
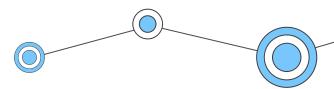Places with the most fatalities
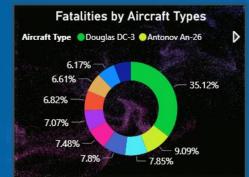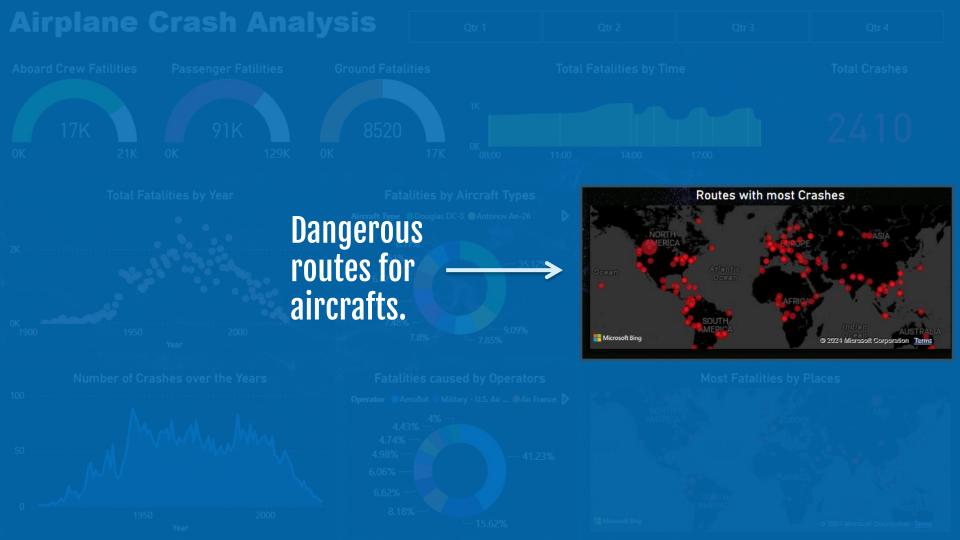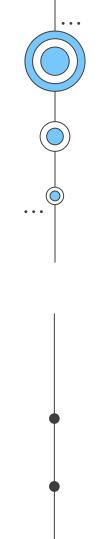
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Project Conclusion

Conclusion

Based on the comprehensive analysis conducted through Microsoft Power BI, the following conclusions have been drawn:
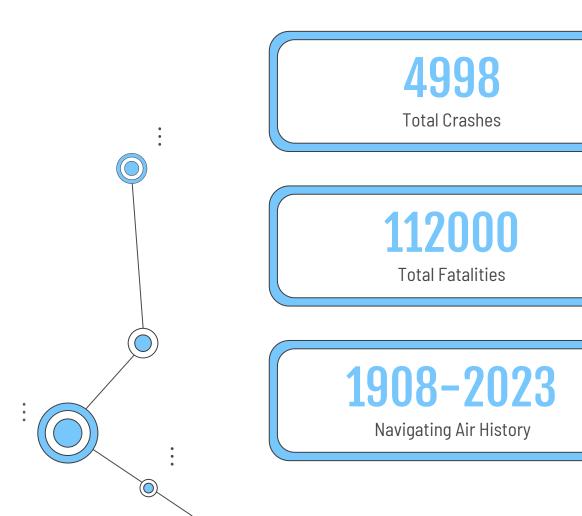
1. Temporal Analysis: There are discernible trends in airplane crashes over the years, with certain periods showing a higher frequency and severity of incidents. This could be attributed to various factors such as advancements in technology, changes in aviation regulations, and global events.
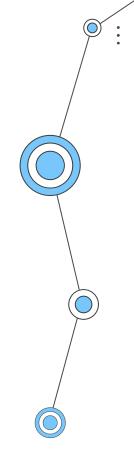
2. Geospatial Analysis: Certain geographical regions emerged as hotspots for airplane crashes. The distribution of incidents varied across different regions, possibly due to factors like air traffic density, terrain, and weather conditions.

3. Operator Performance: The safety records of operators and airlines varied significantly. Some operators had higher incident rates, indicating a need for improved safety measures and protocols.

4. Aircraft Analysis: Specific types of aircraft were more frequently involved in incidents, suggesting potential areas for further investigation.

5. Fatality Trends: Trends in passenger and crew fatalities were explored. Certain factors were identified that contributed to fatalities, providing valuable insights for enhancing safety measures.

6. Route Analysis: Certain flight routes exhibited a higher likelihood of incidents. This could be due to factors such as route complexity, weather conditions, and air traffic.
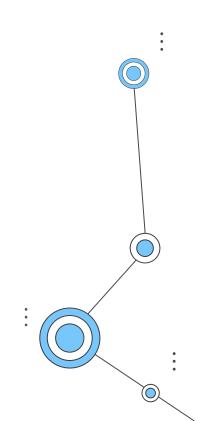
In conclusion, this analysis provides valuable insights into various aspects of aviation safety. It highlights areas for improvement and can guide efforts towards enhancing safety measures and mitigating risks in the aviation industry.

4998
Total Crashes

112000
Total Fatalities

1908–2023
Navigating Air History

Thanks!