

UK Road Safety Insight Dashboard

Project Case Study

Overview

This project is a demo data analysis case study focused on UK road accidents. The goal was to build a compelling dashboard using Excel that could aid decision-making by stakeholders such as the Ministry of Transport. The data used was sourced from Kaggle and involved various variables relating to road accidents, vehicle types, weather conditions, and geographic details.

Objective

To create an interactive and insightful dashboard that would help the Ministry of Transport identify high-risk areas, trends in accident causes, and make data-informed decisions to improve road safety.

Understanding the Dataset

The dataset included several columns such as:

- **Accident Index**
- **Light Conditions**
- **Junction Control & Details**
- **Local Authority**
- **Carriageway Hazards**
- **Longitude & Latitude**
- **Number of Casualties**
- **Type of Vehicles Involved**
- **Road Type & Surface Conditions**
- **Speed Limit**
- **Weather Conditions**

At first glance, not all fields were clear. For example, columns like "Junction Detail" and "Carriageway Hazard" needed context to be fully understood. So, I did further research and watched explanatory YouTube videos to fully grasp the meaning and relevance of each column.

Data Cleaning and Preparation

Once the structure of the data was understood, the next step was cleaning. The dataset had a few issues:

- **Duplicate values**
- **Misspelled entries** (e.g., different versions of the same local authority)
- **Inconsistent formats** (e.g., weather conditions written differently)

Actions taken:

- Removed duplicates
- Replaced invalid or inconsistent values with standardized entries
- Handled null values where necessary
- Ensured all categorical variables were uniform for analysis

Key Focus Areas for Dashboard

Based on the stakeholder's expected insights, I identified the most relevant metrics:

- Accidents by **Light Conditions**
- Accidents by **Weather Conditions**
- Accidents by **Road Surface Conditions**
- Distribution of **Vehicle Types Involved**
- **Geographic distribution** of accidents using coordinates

Dashboard Development

I built the dashboard entirely in Excel using:

- **Pivot Tables** to aggregate the data meaningfully
- **Slicers** for interactivity
- **Conditional formatting** for highlighting insights
- **Charts** (Bar charts, Pie charts, Line charts) to visualize the metrics

Each chart was carefully selected based on the kind of data being represented:

- **Bar and column charts** for comparisons (e.g., weather or light condition)
- **Pie charts** to show proportions (e.g., vehicle types)
- **Line charts** for trends over time

The dashboard layout was structured for clarity, allowing decision-makers to understand the key insights at a glance.

Outcome & Value

The final dashboard:

- Offered a snapshot of accident trends across different conditions
- Highlighted risky conditions (e.g. poor lighting or wet roads)
- Made it easier for stakeholders to drill down into specifics (e.g., filter by region or weather)

For a demo project, this showcased not just technical Excel skills, but also the ability to think analytically, clean real-world data, and design visuals for decision-making.

Stakeholder

- **Ministry of Transport** (represented as the key decision-maker for road safety policies)

Value to Stakeholders

The dashboard offers:

- Quick identification of high-risk cities and road types.
- Contextual understanding of accident causes.
- Actionable data for interventions in infrastructure, behavior campaigns, and enforcement.

Key Insights from the Analysis

- **417,882 casualties** reported between 2021–2022, with 84% being slight injuries and 2% fatalities.
- **80% of casualties involve cars**, highlighting a strong need to target personal vehicle behavior.
- **74% of casualties occurred on single carriageways**, suggesting the need for infrastructure review.

- **Most accidents happen in urban areas**, particularly in **Birmingham, Leeds, and Manchester**.
- **Contrary to assumption**, most incidents happened during **daylight and dry road conditions**, pointing to behavioral issues, not environmental ones.

Tools Used

- **Excel** (for cleaning, analysis, and dashboard creation)
- **YouTube & Google** (for domain understanding)

Summary

This case study demonstrates the process of turning raw, messy data into a decision-ready tool. It shows an understanding of the data lifecycle from exploration to insight generation and the ability to build something practical and insightful using just Excel. The insights gained could directly support national road safety strategies, infrastructure development, and awareness campaigns.